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ABSTRACT

This edition of the United Nations Environment Programme (UNEP) annual report is structured in three parts. Part 1 focuses on three contemporary problems (ground water, toxic chemicals and human food chains and environmental economics) and attempts to solve them. Also included is a modified extract of "The Annual State of the Environment Report" presented to the ninth session of the UNEP Governing Council by the executive director, Dr. Mostafa K. Tolba. Part 2 contains separate reports on UNEP activities, including: environmental monitoring; International Referral System for Sources of Environmental Information (Infoterra); chemicals in the environment; outer limits and basic human needs; human settlements; human/environmental health; desertification; soils/water conservation/living and genetic resources; environmental management and the integrated approach to environment and development; environmentally sound and appropriate technologies; oceans; ecosystems; environmental law; industry and environment; natural disasters; energy; environmental education; environmental data; information; and expenditures of the Environment Fund. Major program/project activities and costs (when appropriate) are provided in these reports. Part 3 includes a guest editorial (by A. W. Clausen) entitled "Sustainable Development - The Global Imperative." (JN)

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# UNITED NATIONS
# ENVIRONMENT PROGRAMME
## ANNUAL REVIEW 1981

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This edition of the UNEP Annual Review is structured in three parts: the 1981 State of the Environment Report; sectoral reports of the work of UNEP in 1981; and a guest editorial from a distinguished contributor.

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# PART ONE:

# THE STATE OF THE WORLD ENVIRONMENT 1981

The State of the World Environment Report focuses on a number of urgent and emerging topics of international importance. Several of these topics are covered each year. This report focuses on three contemporary issues: ground water, toxic chemicals and human food chains and environmental economics. The report highlights the problems encountered and the attempts to solve them.

## 1. Introduction

There is no doubt that the 1970s brought an increased awareness among both policy-makers and public of the possible unwelcome side-effects of actions designed to increase the productivity of the physical environment and to meet essential human needs. Because development remains of the highest priority, this recognition led on to efforts at national, regional and international levels to reconcile such policies with the environment. The past decade has brought into focus numerous environmental issues that had, hitherto, been neglected or not given sufficient attention. Many of these issues have already been dealt with in previous annual state of the environment reports (1-7) implementing thereby the mandate given to the Governing Council by General Assembly resolution 2997 (XXVII) of 15 December 1972, to "keep under review the world environmental situation in order to ensure that emerging environmental problems of wide international significance receive appropriate and adequate consideration by Governments".

This year the state of the environment report focusses on three important topics selected by the Governing Council (decision 8/1 of 29 April 1980, section VI): ground water, toxic chemicals and human food chains and environmental economics. The first represents a renewable resource that unless exploited in a rational way and protected from pollution would deteriorate in quantity and quality, thereby causing a wide range of negative socio-economic and environmental effects. Yet there are many inadequacies in man's knowledge of the hydrogeology, hydro-dynamics and geochemistry of ground water, requiring considerable research. The movements and fate of different pollutants in aquifers are not adequately understood, and partly because of this, measures to prevent ground water pollution or to give an early warning of deterioration or depletion are inadequate.

Whether man drinks contaminated water or contaminants find their way to his food via other pathways, a number of health risks can arise. Many of the numerous chemicals used by man for various purposes enter the environment, and reach human beings directly or indirectly. Food is, of course, one of the basic pathways by which chemicals reach man and, the effects can be serious, as various recorded cases of acute poisoning have demonstrated. However, the risks to man arising from the accumulation of toxic chemicals at lower concentrations in human food chains are not sufficiently understood.

The protection of man and his environment from these and other hazards has a cost, which rises very steeply with the level of protection. Until recently, wastes could be discharged freely into air and water, which nobody owned, and land, once it had been acquired, could be exploited without restraint. But such practices are no longer acceptable in most countries. The costs of disposing of wastes have begun to be internalized, and the bill for pollution abatement is being added to the cost of the product. The reasonable price to pay for protecting the environment can only be decided through value judgements which attempt to balance damage costs and control costs. Most people would accept that there must come a limit of cost above which further control or clean-up expenditure becomes unreasonable. But not all the damage to the environment can be assessed in money terms; there are many effects on man and his environment that cannot be quantified. And herein lies the dilemma of "cost/benefit" analysis of environmental protection. Some industrialised countries have decided to concentrate their industrial activities in certain locations within their territories to benefit from economies of scale in pollution control measures. Other countries, however, believe that maximum geographical dispersion of industrial activities is better to ensure that the natural environmental assimilative capacity is not exceeded. On the other hand, there has been a tendency to relocate some industries in developing countries on economical and/or environmental grounds.

It is not the intention to give here a detailed description of these issues, but to present a brief account highlighting the problems encountered and the attempts to solve them. The report does not pretend to give any final solutions or recommend plans of action. It is rather designed to stimulate discussions from which solutions may emerge.

## 2. Ground Water

The earth, in contrast to other planets, is well endowed with water. Not only was this a vital factor in the development of life, but it has provided a certain stability during the earth's subsequent evolution.

On land, fresh water runs in rivers, pauses in lakes and swamps, is contained in small pores in the soil, and may be resident as ground water in water-bearing formations for long periods of time – from a few months in shallow aquifers to millennia in deep ones. Overflow from this storage reservoir eventually takes place in low areas – wetlands and stream channels. This outflow into stream channels is one indication that the surface water and ground water of any region form a single system. Another connexion is the recharge of ground water by leakage from river channels in certain geological situations, especially at the foot of desert mountains.

Ground water is highly valued for certain properties not generally possessed by surface water. It does not suffer evaporative loss while stored against a coming dry season or dry year; it is free of mud and sediment; it is biologically clean (if uncontaminated by human actions); and it is generally accessible to any manager of land overlying an aquifer at no cost of conveyance from its source.

Ground-water aquifers (water-bearing formations) are often transnational in extent, and their resources are thus shared by neighbouring countries. The inventory, development and rational management of such shared resources need to be carried out within the framework of regional co-operation, and in accordance with agreed principles of shared resource management.

### A. Facts and figures

Various estimates have been made of the total volume of water on earth, and its distribution between the oceans, ice caps, surface streams, rivers and lakes, and underground aquifers (8, 9). It is commonly stated that some 97 per cent of the earth's water is in the oceans and 3 per cent is on land. Of the latter some 77 per cent is stored in ice-caps and glaciers, 22 per cent is ground water, and the remaining tiny fraction is present in lakes, rivers and streams. A substantial proportion of the ground water stock, which represents the accumulation of centuries of recharge trickling down through soil pores from the overlying ecosystems, lies below 800 m depth, and is beyond man's present capacity to exploit. The volume of accessible ground water is nowadays, estimated to be about 0.3 million Km$^3$.

Ground water is extensively used in some parts of the world, and this has resulted in the excessive exploitation of some water-bearing formations. Over-exploitation of ground water disturbs the state of equilibrium of the reservoir, resulting in, for example, a lowering of the water table, decreased pressure in the aquifers, and changes in the speed and direction of flow of water, etc., all of which could disturb the hydrological cycle in the region, triggering several negative environmental impacts. Land subsidence is an important one: subsidence rates range from about 1 to 50 cm per 10 m drop in ground-water level depending on thickness and compressibility of the water-bearing formations (10). Desertification could be enhanced by the deterioration of plantations due to the reduction in the moisture and/or water coming to their roots from the water table. In coastal areas, over-exploitation of ground water would lead to rapid intrusion of salt water from the sea, with considerable detrimental effects on soil and plantation (11).

Ground water, in its percolation through soil and rocks, leaches out soluble salts; it is thus typically mineralized, and sometimes heavily so (12, 13). The vulnerability of ground water to contamination is determined by the hydrological setting of the aquifer, the nature of the contaminant and the effectiveness of regulatory action (14).

Of all the activities of man that influence the quality of ground water, agriculture is probably the most important, as a diffuse source of pollution from fertilizers, pesticides and animal wastes (15, 16). Of the main nutrients in nitrogen, phosphorus and potassium fertilizers, nitrogen in the form of nitrate is the most common cause of degradation of ground water near agricultural lands. Nitrate nitrogen concentrations in water percolating to the ground water are dependent on the rate and amount of application of fertilizer, type of fertilizer, the sequence of plant absorption and the amount of organic and inorganic nitrogen already in the soil, as well as on physical factors such as soil permeability, soil moisture and the amount of water applied in irrigation (16). Water becomes unsuitable for potable use by infants when nitrate concentrations exceed 45 mg/l, and such levels can at times be reached in shallow ground waters in agricultural areas.

Despite their low solubility, organochlorine pesticides are toxic, and ground water containing even a few parts per billion of these compounds may be unsafe for drinking purposes. Most organochlorine pesticides are strongly adsorbed on soils, however, and because of this the threat to ground water quality is limited (16).

Biochemical processes convert organic nitrogen compounds in animal manures to nitrate, and in many agricultural areas this has also led to local degradation of ground water farm middens, slurry ponds, and feedlots and other intensive livestock units. However, unless these sources are directly underlain by aquifers, this is not usually a significant source of pollution.

The natural processes of leaching, through which ground waters generally come to contain more dissolved salts than surface fresh waters, can be accentuated in irrigated areas, where soluble salts may be concentrated in the upper soil layers and around plant roots. Such a degradation in ground water quality has become a serious problem in many areas of the world (16, 17). However, it is not an inevitable consequence of irrigation development, and can be alleviated by good water management systems, especially the reduction of seepage losses from irrigation channels and better farm water management (irrigation schedules, control of water quantities and good irrigation and drainage system design).

Industrial wastes include a wide spectrum of materials from all types of industry, and contain many organic and inorganic chemicals which are potential pollutants. Industrial wastes reach ground water from impoundments or lagoons, spills, pipeline breaks and land disposal sites. Industrial lagoons and impoundments are the most common sources of contamination.The United States Environmental Protection Agency has identified about 181,000 such lagoons at industrial and municipal waste disposal sites throughout the United States of America (18).

Septic tanks and cesspools contribute filtered sewage effluent directly to the ground, and are the most frequently reported sources of ground water contamination, especially in rural, recreational, and suburban areas (15). An increasing percentage of the municipal sewage is, however, now being processed in primary and secondary sewage treatment plants. In many areas, the solid residual material known as sewage sludge – which contains a large number of potential contaminants – is spread on agricultural land. In some regions liquid sewage that has not been treated or that has undergone partial treatment is spreayed on the land surface. Such application of liquid sewage and sewage sludge to the land provides valuable nutrients such as nitrogen and phosphorus to the soil, with benefits to agriculture. However, the waste water or sludge can add to the contamination of ground water. The soil profile shows a considerable ability to remove or detoxify several of the compounds found in the waste water, but some may nonetheless affect ground water quality. The soil may also effectively eliminate the pathogenic bacteria through filtration and soil microbiological processes, but survival of viruses is still an open question (16).

Solid wastes (industrial or urban) were formerly disposed of in open dumps, but are now generally placed in engineered systems known as landfills. Buried refuse in sanitary landfills and dumps is subject to leaching by percolating water, and the leachate may contain several inorganic and organic contaminants. If the landfills are located in relatively permeable strata such as sandstone or fractured rock, leachate migration may cause ground water contamination over large areas. Such problems can be avoided only by careful evaluation of the hydrogeological features of sites before they are licensed for disposal, or by the development of new techniques of waste disposal, such as incineration, which is being used increasingly in developed countries for the destruction of the most toxic substances.

Mining and quarrying activities also generate large quantities of wastes, and may break through underground aquifers and release drainage that is often very acid and contaminated with toxic metals (such as copper and zinc salts). Uncontrolled return of these waters to underground aquifers can lead to more general contamination.

Deep-well disposal of liquid wastes (toxic industrial wastes, oilfield brines, etc.) can cause serious degradation of the quality of ground water. Escape of wastes through the well bore into freshwater aquifers can occur as a result of insufficient casing or of casing failures due to corrosion or other causes. Wastes can also escape because they are not confined by truly impermeable strata. Where such wells are permitted, detailed geological and geotechnical studies must be undertaken to avoid possible contamination of ground water (as well as possible seismic hazards). Well-casing methods, rates of injection of wastes and the characteristics of the wastes are among the important factors that should be considered.

Containers of low- and intermediate- level radioactive wastes resulting from nuclear facilities have been disposed of by burial in shallow excavated trenches, covered with soil. The past history of shallow low-level waste burial in the United States of America is less than satisfactory; leakage of radioactive constituents to the environment has occurred at some sites (15). Although at present this leakage to subsurface flow systems does not present a hazard to potable water supplies, it is striking evidence that undesirable consequences of inadequate hydrogeologic studies of waste management sites can become evident many years or decades after site use begins. The problem facing hydrogeologists now is to ensure, through use of proper site search and evaluation methodologies, that sites for shallow burial of low-level wastes, or deeper disposal of long-lived wastes in vitrified form, have adequate radionuclide containment capabilities and that proper subsurface monitoring facilities are installed and operated (15, 19, 20).

## B. The problem

Ground waters are being misused both by over-exploitation and by practices which allow unnecessary quality deterioration. Over-exploitation can lead not only to the "drying up" of wells, but also to several detrimental environmental impacts, for example land subsidence, encroachment of saline water if the aquifer is near coastal plains, desertification, etc. Hydrologic and hydrodynamic models are the most reliable aids for planning the rational exploitation of ground water in a region (21), but for them to provide dependable guidance a thorough inventory of the content and dynamics of the aquifers must first be undertaken.

Ground waters are naturally mineralized, and their composition can place constraints on their use. It is extremely important to know if their composition is changing for the worse. And yet because of the heterogeneous nature of ground water systems, the slow rate of movement of water in them, and the even slower dispersion of a plume of contaminant, zones of degraded ground water may be very difficult to detect. The United States Environment Protection Agency has reported that almost every known instance of aquifer contamination has been discovered only after a water-supply well has been affected (15). By the time subsurface pollution is conclusively identified, it is often too late to apply remedial measures that would be of much benefit.

Ground water monitoring is often neglected because its importance is not recognized. When this is combined with the complex legal and institutional status of a ground water body, prudent management becomes difficult. It is still more difficult to see how to integrate ground water with surface water resources, in spite of the benefits of joint management of two resources of such complementary characteristics. Whereas the problem of achieving acceptable quality of surface waters focusses mainly on decreasing the known emissions of pollutants to these systems, the problems facing scientists and engineers involved in the protection of ground water resources are to identify the areas and mechanisms by which pollutants can enter ground water flow systems and to develop reliable predictions of the transport of contaminants within the flow systems. This is necessary as a basis for minimizing the impact of existing or proposed industrial, agricultural, or municipal activities on ground water quality.

Ground water management should be seen as an integral part of the over-all water development plan of a country – or, where the aquifer extends more widely, of several countries. It should focus on the rational exploitation of the resource, and on protection of ground water from pollution. A series of educational, institutional, legal and economic measures may therefore be necessary to improve pollution control, and impose standards for effluents and appropriate regulation of their disposal. Ground water monitoring to obtain an early warning of the depletion of the resource or of its pollution is an important component of sound management.

### C. Major actions taken or planned

During the past 15 years, the United Nations ground water exploration and development programme has involved over 100 projects, bringing substantial socio-economic benefits to 57 developing countries. It has contributed to the improvement of agricultural production through supplemental irrigation from ground water and to the alleviation of water shortages in urban and industrial areas through construction of supply wells.

Assessment of ground water resources has been carried out in most United Nations projects. Ground water maps covering areas ranging from 5,000 km² to more than 100,000 km² have been prepared in more than 25 countries. Some 150 fellowships for training abroad have been granted to technical and professional personnel associated with United Nations ground water projects (22). In line with the recommendations of the United Nations Water Conference, due consideration is being given to ground water in the guidelines developed by the United Nations for comprehensive water resources policy.

Within the United Nations system, FAO, the UNESCO, WHO and the World Bank have also been involved in activities related to groundwater resources. FAO has carried out over 100 ground water development projects over the past 20 years in more than 40 developing countries. UNESCO has been concerned with scientific and educational exchanges in ground water geology and hydrology. WHO has been concerned with the protection of rural and urban water supplies against disease vectors. The World Bank has funded large-scale ground water development projects for irrigation or livestock water supply (22, 23). UNEP activities relating to ground water, which are undertaken in co-operation with other agencies, are directed towards the implementation of the Plan of Action to Combat Desertification, an important element of which consists of regional surveys and studies on aquifers and exploitation of ground water. Some regional organizations also have a number of activities related to ground water conservation and protection from contamination.

### D. Concluding remarks

Ground water is a highly misunderstood resource and, due to its location, is "out of sight, out of mind". Its significance in the total water resource picture, and its vulnerability, have not been generally realized. Problems with ground water quality continue to grow. Land-use practices that severely contaminate the land surface may, in future years, cause severe contamination of ground water supplies, as will accidental spills and discharges. Increased loading of the soil with fertilizers, insecticides and herbicides, plus the thousands of synthetic substances manufactured each year, is also liable to contaminate this valuable resource. The ground water protection programmes of most countries are inadequate and will remain so until the need to develop adequate understanding and management of the resource is recognized by those with legislative responsibility.

Surface water and ground water resources do not exist separately but should be seen as an entity: the unified water resource. In planning for river basin development, the utilization of ground water resources should be considered as one of the alternative ways of meeting the demand for water, especially in large sedimentary basins. The combined utilization of surface waters and ground waters gives the technically best and most economical solutions in most cases. Attempts have to be made therefore, to achieve the optimum combination of the two sources in the management of regional water systems.

Once contaminated or depleted, ground water resources may be permanently diminished. It is therefore all the more important to prevent such losses through the stringent scrutiny of new waste disposal practices, new procedures for the application of chemicals to the land surface, and other actions which may endanger aquifers, followed by the imposition of adequate controls. This is not simply an instance where prevention is better than cure, but where prevention is the only available option.

## 3. Toxic Chemicals and Human Food Chains

The rapid growth of the metal, chemical and allied industries during the present century has resulted in the production and use of thousands of chemical compounds, a number of which are potentially hazardous to human health. Substantial amounts of these compounds have been discharged into the environment in airborne emissions, liquid and/or solid wastes.[1] On the other hand, several chemical compounds, such as pesticides, have been intentionally applied to various parts of the environment to control the spread of vector-borne diseases and/or to increase food production to feed the world's growing population. There can be no question that many chemical products have on balance brought benefits to man; in the case of others, however, the benefits have been outweighed by the considerable environmental damage they have caused.

Man is exposed to chemicals in three main ways – by inhalation, by ingestion and through contact with his body surface. As far as the general population is concerned, food (including drinking water) is the major source of exposure to most toxic chemicals. These substances reach human food by many routes. Some contaminate it directly in preparation or processing. Others pass from soil to plants, and thence via herbivorous animals to meat or milk. Strictly speaking, a food chain is a sequence of the latter kind, and discussion of toxic chemicals and human food chains should concentrate on the circumstances under which potentially hazardous materials reach man via intermediate organisms. In the interests of comprehensiveness, however, this chapter also discusses the consequences of direct contamination of food and drinking water.

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[1] *The general subject of chemicals and the environment is reviewed in the 1978 state of the environment report.*

Many chemicals released into the environment undergo physical and chemical changes which may affect their toxicity. While many are broken down into relatively harmless products, others are converted to highly toxic substances which can pose a threat to human health. An example of the latter is the conversion of inorganic mercury compounds to the much more toxic methylmercury which accumulates in fish in such amounts that it has led to mercury poisoning in man.

Monitoring programmes are providing information about the concentrations of certain substances (notably long-lived radioisotopes, persistent organochlorine pesticides, polychlorinated biphenyls (PCBs) and metals) in human tissues, selected foodstuffs and wildlife. These inadequacies result partly from differences in analytical techniques (and the lack of good methods for measuring some contaminants) and partly from statistical sampling problems. As a result, general statements about the scale of the food contamination problem are bound to contain various inaccuracies. The GEMS Food Contamination Monitoring Programme, in which 21 countries are participating with the joint support of UNEP, FAO and WHO, is seeking to reduce these through international co-operation.

At the same time, as more evidence of contamination of food with toxic chemicals has been obtained, it has increasingly been realized that knowledge about the hazard to human health posed by many chemicals present in food is inadequate. Thus, although toxicological tests have provided data on the short-term effects of many well-known chemicals, there is a dearth of reliable information about the long-term risks involved in exposure to most substances. The general public is understandably concerned by the fact that toxicologists are at present unable to give reliable estimates of the risk of carcinogenic, teratogenic and mutagenic effects following long-term exposure to low levels of many of the chemicals present in food.

### A. Facts and figures

Hazardous chemicals present in food and water comprise a wide range of both inorganic and organic substances. Such substances can be derived from a variety of sources, of which the most important are: air pollutants deposited directly onto the aerial parts of food plants; pollutants taken up from the soil or irrigation water via the roots of food plants; pollutants taken up from the aquatic environment by fish and other aquatic organisms; residues of bioactive substances used in animal husbandry and their metabolites; substances produced by the growth of bacteria or moulds in or on foods; residues of agricultural pesticides and metabolites and breakdown products thereof; substances produced during food manufacture or preparation; substances migrating from food packaging material or leached from ceramic and enamelled foodware; contaminants present in drinking water, e.g. those resulting from chlorination or contact with lead or copper pipes; intentional food additives.

Although there is satisfactory understanding of the acute effects of some substances on human health, there is much less information about the effects of exposure to many materials, including those present in food, over long periods. Such risks cannot be assessed solely on the basis of the results of animal studies in which the substance in question has been administered alone. Such factors as interactions (both chemical and biological) with other substances present in the human diet, nutritional status, intercurrent disease and the existence of especially vulnerable groups in the population must be borne in mind.

Direct deposition on the leaves and other aerial parts of plants is an important source of food contamination (24). While deposited particles are largely present as surface contamination and can be removed by careful washing or by discarding outer leaves when the food is prepared, some substances enter the tissues of the plant. Residues of pesticides applied directly to the aerial parts of plants close to the time of harvest or used post-harvest will be present to some extent in the food when it is consumed. The use of ethylene oxide for the fumigation of spices results in the presence of residues of this mutagen and certain of its biologically active reaction products in the fumigated products. The ingestion of contaminated bread prepared from wheat and other cereals treated with alkyl-mercury fungicides has resulted in a number of epidemics of poisoning in a number of countries. The largest recorded epidemic, in Iraq in 1971-1972, resulted in the admission of over 6,000 patients to hospital and over 500 deaths in hospital (25).

Toxic chemicals present in the soil may be taken up by the roots of plants used as food for man or animals. Such substances may enter the soil by dry or wet deposition of atmospheric pollutants, from contaminated irrigation water or from pesticides, fertilizers and sewage sludge applied intentionally to agricultural land, and through the deposition of toxic industrial wastes. Mining and the processing of metalliferous ores can cause intense local soil contamination with cadmium, zinc and lead. The epidemic of chronic cadmium poisoning (itai-itai disease) in Japan in the 1940s was caused by the consumption of rice and other foods which were heavily contaminated with cadmium taken up from irrigation water polluted with effluent from a zinc mine (26). There is some evidence that in Sweden the level of cadmium in autumn wheat has increased during the last 50 years, probably due to contamination of the soil with cadmium by deposition from the atmosphere or from phosphate fertilizers (27).

Toxic chemicals discharged intentionally or accidentally into rivers, lakes and other waters, or deposited there directly from the atmosphere or by run-off from the land, may enter the human food chain via fish and other aquatic organisms or via the plants on which they feed. Some of the chemicals are concentrated and/or transformed into other compounds by organisms. For example, inorganic mercury is converted into methylmercury, which accumulates in aquatic organisms, the highest concentrations being found in carnivorous fish such as pike, tuna and sharks (28). Cadmium and lead are concentrated within particulate matter which is taken up by edible molluscs such as mussels and oysters (29). The contamination of rivers, lakes and coastal waters with organochlorine compounds, such as DDT, PCBs and toxaphene, or with hydrocarbons and other substances as a result of oil spills, has led to a marked increase in the levels of these compounds in fish and other aquatic organisms.

The two major epidemics of methylmercury poisoning in Japan in Minamata Bay and in Niigata were caused by the industrial release of methyl- and other mercury compounds into Minamata Bay and the Agano River, followed by accumulation of the mercury by edible fish (25). From 50 to 30,000 times more methylmercury than the normal level was found in the dead bodies of Japanese fishermen at Minamata (30). With at least four times greater sensitivity to methylmercury, the foetus absorbed the compound from the mother. Some newborn infants at Minamata had 20 to 30 per cent more mercury in their blood corpuscles than in those of the mother. An unusually high proportion of children were born with rare deformities that usually occur at a rate of less than 1 per 1,000 births (30).

Fish can also accumulate PCBs. PCBs can be transferred to milk and eggs through the inclusion of PCB-contaminated fishmeal in the feed of cows and poultry. The level of PCBs in fish flesh used as food is usually below 0.1 mg/kg, but levels above 1 mg/kg have been reported in fish from contaminated waters (31). The toxic effects that may results from PCBs include hypersecretion in the eyes, pigmentation and eruptions of the skin and disturbances of the respiratory system. PCBs have also been found to produce liver cancer in rats and mice, but the carcinogenic risk posed by exposure to the amounts normally ingested by man remains uncertain.

The toxins produced during the growth of certain bacteria in or on foodstuffs are among the most toxic substances known, and it is difficult to avoid some contamination of foods with these organisms. However, heat treatment, and the addition of preservatives such as salt and nitrites, will eliminate or reduce the risks from some toxins. Mycotoxins produced by the growth of certain moulds on foodstuffs are also a potential source for contamination of food and animal feeds. The extent to which contamination occurs varies widely, depending on the conditions under which susceptible crops are grown, harvested and stored. Crops grown in areas with high humidity and temperature, i.e. tropical and subtropical regions, are most subjected to contamination, since these conditions are favourable for toxin formation. Growing crops may be infected with the toxin-producing fungi as a consequence of insect or other damage, and the toxins may be produced prior to or during harvesting or during transport and storage (32).

Toxins (aflatoxins) have been detected in groundnuts, maize and tree nuts, which form a major part of the diet in some countries, and in other foods. Aflatoxins produce liver damage in many species of animals and outbreaks of aflatoxicosis in farm animals have been reported from many parts of the world. Epidemiological data from Kenya, Mozambique, Swaziland and Thailand show a positive correlation between daily dietary aflatoxin intake and the crude incidence rate of primary liver cancer (33). An outbreak of epidemic jaundice with a high mortality rate affected more than 150 villages in north-west India in 1974, resulting in about 97 deaths and 994 affected individuals. The outbreak commenced with the consumption of badly stored maize; the affected people could have been exposed to considerable quantities of aflatoxins for several weeks (32).

Antibiotics, hormones and other drugs are widely used in veterinary medicine and animal husbandry to treat or prevent infectious and other diseases and as growth-promoting agents (34, 35). Residues of these substances may be present in foods of animal origin, e.g. meat, milk and eggs. Although the residue levels are usually very low, and probably pose little risk to human health, there is concern about the risk of development of pools of antimicrobial-resistant bacteria pathogenic to man or domestic animals.

Preservatives and anti-oxidants are of potential benefit to human health because they prevent food spoilage due to the growth of micro-organisms and oxidation, respectively. The most commonly used intentional food additives have been subjected to toxicological testing in different countries. However, special problems arise in evaluating the hazards associated with the use of some food additives, such as nitrites and sulphur dioxide, which can react with other food components. Certain food colours and preservatives can produce hypersensitivity (asthma and urticaria) in a small fraction of the population (36). Nitrates can be reduced by bacteria to nitrites in foods and in the oral cavity, the gastro-intestinal tract and the urinary bladder (37). Nitrites react with amines in the stomach to form N-nitrose compounds. A large number of such compounds (e.g. nitrosamines) have been shown to be carcinogenic in animal studies and there is a strong possibility that some nitrosamines are carcinogenic to man (38).

During commercial processing and domestic preparation foods may become contaminated with a variety of toxic chemicals. Fresh fish and meat do not contain detectable amounts of carcinogenic polycyclic aromatic hydrocarbons (PAH), but trace amounts of such substances are found in smoked and grilled foods (39). In addition to PAH, smoked foods contain a wide variety of phenols and other organic compounds derived from the smoke (40). It has been shown that heating proteins or certain aminoacids results in the formation of compounds which are mutagenic in bacterial tests and therefore potentially carcinogenic (41).

Canned food can become contaminated with tin from the can walls or lead from lead-soldered side seams (the former problem is being solved by use of plastic can linings, and the latter by the elimination of soldering, for example, by the use of compression). The levels of lead in canned foods are often five to twenty times as high as in the corresponding fresh foods or foods packed in other types of container (42).

## B. The problem

With the increase in the production and use of chemical compounds, man has become more and more exposed to the deleterious effects of some of them. Considerable research is still necessary in order to elucidate the different pathways and fates of toxic chemicals in the environment, the routes of chemicals in food chains and the health hazards resulting from these substances. In the case of many chemicals, it is still not known how far man is at risk from exposure to very low concentrations over a lifetime. Major problems also remain in developing countries, where post-harvest losses are a serious waste of scarce resources. Their prevention can involve the use of chemicals which are thereby introduced into the food chain, substituting a new potential problem. This, too, is an area where careful screening in advance of the adoption of new techniques is likely to save much expense.

Despite advances in analytical techniques, there is lack of sensitive analytical methods for certain toxic chemicals, e.g. non-volatile N-Nitroso compounds in food. There is also the urgent need to improve sampling techniques and intra-laboratory analytical quality control in the field of food analysis. Well-organized national food control systems are also necessary to ensure that the population is not exposed to foods containing unacceptably high levels of chemical or biological contaminants. In addition, there is the essential need for the identification of the sources of contamination and then its elimination or control. And finally, there is the need for much better international co-operation to obtain further agreement to restrict the discharge of toxic chemicals into rivers and to limit atmospheric pollution by chemicals which can affect food production or increase the levels of toxic substances in food.

### C. Major actions taken or planned

Action has been taken in most member countries of the Organization for Economic Co-operation and Development (OECD) to restrict or ban the production and use of selected persistent chemicals such as DDT, aldrin, dieldrin, PCBs and alkyl mercury compounds. The use of PCBs in OECD countries, for example, has in consequence fallen by a factor of 10 between 1973 and 1978 (43). The recently initiated special programme on the control of chemicals in which 13 countries and the European Economic Community are participating is an additional move to improve the basis for action and to achieve policy harmonization.

WHO and FAO created the **Codex Alimentarius** Commission in 1962 with the primary objective of protecting consumers from health hazards related to food. UNEP supported the work of the Commission. Under the Joint FAO/UNEP/WHO Food and Animal Feed Contamination Monitoring Programme, 20 institutes in different countries are undertaking studies on animal-feed contaminant monitoring. UNEP's Global Environmental Monitoring System (GEMS), in co-operation with FAO and WHO, prepared in 1979 guidelines for establishing or strengthening national food contamination monitoring programmes. Other activities include the FAO/UNEP/WHO project on mycotoxins, under which fellowships for training in mycotoxin problems were provided and two training workshops were organized (44, 45).

Although many regulatory bodies have introduced national or regional residue limits, pesticide residues in food remain a subject of international concern. The joint meetings of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Expert Group on Pesticide Residues have made considerable progress in providing toxicological evaluations which are in turn taken up by the Codex Committee on Pesticide Residues as a basis for recommending worldwide standards. Studies on pesticide residues in foodstuffs and in total diets are carried out in many countries (46).

Within its Regional Seas Programme, UNEP is co-operating with FAO and other institutions in the monitoring of mercury, cadmium, DDT, PCBs and other chlorinated hydrocarbons in marine organisms in the Mediterranean and East Asian Seas (47, 48). Research on the effects of these and other pollutants on marine organisms and ecosystems is also included in the Programme.

The Environmental Health Criteria Programme, undertaken by WHO with UNEP's support, has produced a number of "criteria documents" that provide information about the relationship between exposure to specified pollutants and effects on human health. The International Registry of Potentially Toxic Chemicals (IRPTC), established by UNEP in 1976, provides information about toxic substances and their characteristics. Recently, WHO developed plans for an international Programme on Chemical Safety (IPCS) to evaluate the effects of chemicals on health, and to develop guidelines for exposure limits. ILO and UNEP are co-operating in this programme.

### D. Concluding remarks

Apart from controlling the discharge of effluents, many other measures can be taken to reduce the levels of toxic chemicals in foods. Examples are: control of the production, use and disposal of pesticides; replacement of currently used persistent pesticides by alternatives which are less harmful to the environment and less likely to accumulate in food chains; reduction in the use of chemical pesticides through gradual increase in the use of ecological and habitat methods of pest control; stricter control of the use of drugs in animal husbandry and rigorous enforcement of regulations on holding periods prior to slaughter; provision of information to growers on techniques for the improvement of harvesting, drying and storage of crops to prevent contamination with toxins, and on methods of optimizing the use of nitrogenous fertilizers in order to reduce pollution of drinking water with nitrates; development of adequate canning and packaging technologies to avoid food contamination; and improvement in food processing technologies to reduce the use of food additives which are of questionable benefit to the consumer. Parallel to these measures, there is a great need for research to understand the mechanisms of migration, transformation and concentration of contaminants in the food chain. There is also need for research on the effects of these contaminants on human health, for development of monitoring systems and for better control methods.

## 4. Environmental Economics

Production is the basis for the existence and development of human society. Human needs are constantly growing, and in order to satisfy these needs, man interacts with and affects the natural environment in a variety of ways, both positive and negative. At the same time, the natural environmental resources of water, soil, plant and animal life constitute the natural capital on which man depends to satisfy his needs.

Until recently, land and natural resources could be exploited without restraint and wastes could be discharged freely into air and water, which nobody owned. The natural resources were considered inexhaustible, because many of them have the capability for self-regeneration. However, it has recently been realized that the process of self-regeneration is a rather slow and complicated one; if some natural resources are over-exploited, the stock will fall rapidly, leading ultimately to the complete destruction of the resource. It has also been realized that air and water have limited assimilative and carrying capacities and that pollution control measures must be instituted to safeguard the environment and the quality of human life.

It is therefore important, if sustainable development is to be achieved, to evaluate the environmental costs and benefits of any development process. But such evaluation is not easy. Some of the environmental effects of development can be easily identified and evaluated quantitatively, others cannot. Nevertheless, an economic analysis of the environmental effects of alternative development processes, partial though it must necessarily be, is important because it creates awareness of the fact that natural resources ought not to be treated as free goods. Good management of the environment should be based upon avoiding wastage of resources and pollution. This is more appropriate and certainly more efficient than redressing environmental degradation after it occurs.

### A. Facts and figures

Environmental costs arise either through the damage done as a consequence of resource exploitation or through the effort expended to redress the damage. Much of the debate about environmental economics in recent years has centred on the fact that the costs of environmental damage may fall on people different from those benefiting from the actions by which the damage is caused, and on means of ensuring that the costs incurred in preventing unacceptable damage are borne by those benefiting from the action liable to create it.

The best available data on damage costs that could be put into monetary terms relate to oil spills in the sea, industrial catastrophes, and floods. For example, clean-up costs of oil spills have been estimated at $US1,000 per barrel of oil spilled (49). In 1974, a huge oil tank in the Mizushima refinery on Seto Inland Sea, Japan, developed an 8 m rupture and spilled about 50,000 barrels of oil into the sea. The total cost of the damage incurred from the spill and from the cleaning operations was about $US160 million (50, 51). The accident at Seveso chemical plant in Italy caused damage estimated at $US150 million. The costs of rehabilitation of the damaged Three Mile Island nuclear power station (after the 1979 accident) have been estimated at over $US1 billion.

Even without accidents, large quantities of pollutants enter the environment as a result of human activities. Several studies attempt to estimate the economic costs of damage caused by such pollution, for example the loss of production due to illness (or death), health expenditure, or losses to agriculture and productivity. The cost of air pollution damages in the United States of America has been estimated to vary between $US2 billion and $US35 billion per year (52). Generally speaking, the economic cost of pollution damage in developed countries varies between 3 per cent and 5 per cent of the GNP, this cost has kept on growing in absolute value (or at best has stabilized) during the period from 1970 to 1980. The results of a French study on 24 pollutants indicate that the cost of pollution in 1978 was between 3.4 and 4.2 per cent of the GNP. One quarter of this damage was due to air pollution and another quarter to noise (53). Comparable figures have also been reported in Canada, Italy and the United Kingdom of Great Britain and Northern Ireland. A recent study in the Union of Soviet Socialist Republics estimates the cost of health expenditure and decreased work efficiency due to air pollution at the equivalent of $US38 per capita, and the cost of damage to pasture and crops as the equivalent of $US130-135 per hectare (54).

Damage costs may also be imposed in the process of development, through the destruction of certain types of renewable resources, e.g. the large-scale loss of tropical forests, soil degradation due to salinization, imperfect cultivation of sub-marginal lands, etc. (55). Some 30 million km$^2$ (19 per cent of the earth's land surface) with a population of about 80 million are threatened with desertification, and consequently with huge economic and human losses (56).

It should be noted that this costing of the damage due to the irrational use of natural resources and/or pollution is far from being complete. Environmental damage is often selective and unequally distributed in time and space and among societies. Many of the physical, biological and socio-economic consequences of large development projects are inadequately known, and some can be quantified while others cannot. Examples of the latter are when landscape or historic monuments are threatened with irreversible change. Even if all the consequences could be enumerated and their likelihood assessed, placing a price tag on them would pose further difficulties. Consider, for example, the problems of placing a value on a human life. The traditional economic approach has been to equate the value of a life with the value of a person's expected future earnings. Many problems with this index are readily apparent. For one, it undervalues those in society who are underpaid and places no value at all on people who are not in income-earning positions. In addition, it ignores the interpersonal effects of a death which may make the loss suffered much greater than any measurable financial loss.

Like damage, benefits are difficult to compute. They include direct and obvious elements like the profit to industry on the product sold, or the gain to a country from the products exported and the employment provided. But they also include important elements like the stimulus a worthwhile job gives to individuals.

In developed countries, the cost of environmental policies has been estimated to range between 1 and 2 per cent of GNP (57). Most of this expenditure is for pollution abatement and natural resources protection. In the developing countries, the expenditure is much lower and is mainly directed towards drinking water supply and sanitation. Expenditures for pollution control vary from one developing country to another, and in order to control pollution effectively in the third world it would be necessary to allocate between 0.5 and 1 per cent of the GNP for that purpose (58). These figures should be seen in the light of the cost of pollution damage in developed countries, which amounts to 3-5 per cent of GNP *(Refer back four paragraphs).*

The costs of environmental policies are generally more than compensated for by the benefits accrued from reducing the damage. It has been estimated, for example, that the health benefits from a 60 per cent reduction in air pollution in the United States of America would amount to a total annual saving of $US40 billion (59). The United States Environmental Protection Agency has estimated that the 12 per cent decrease in particulates alone achieved between 1970 and 1977 provides $US8 billion in health benefits each year, compared to the total 1977 expenditures on controlling all air pollutants from stationary sources (the primary source of particulates) of $US6.7 billion (59). In the developing countries, the costs of improving the quality of the environment and of protection of natural resources are far outweighed by the benefits accrued to society. For example, the construction of drinking water or sewage systems in third world countries could reduce the incidence of infectious diseases such as typhoid, dysentery, cholera, schistosomiasis, etc. by 50 to 60 per cent or even more (60). Such an improvement in human health will lead not only to an increase in productivity and time on the job (both of which contribute to increased GNP), but also to less expenditure on goods and services delivered by the medical sector, most of which are imported.

Environmental awareness and the introduction of strict environmental control measures in some countries have encouraged the develpment of alternative technologies, for example, recycling and low-waste and non-waste technologies. From an economical point of view, such technologies could lead to substantial savings.

Thus in Norway, strict measures to control atmospheric pollution have led to innovations in the production of ferrosilicon which have reduced production costs by 8 to 12 per cent. In Sweden, changes in the pulp industry from sulfite to sulfate process and re-cycling of waste water led to reduction in water consumption, production costs and wastes discharged. A similar trend has emerged in several other countries, for example China, Finland, France and the United States of America, etc. (57).

On the other hand, environmental regulations and the ban of production and marketing of some products have had some impact on trade and on the location of some industries. In the United States of America, for example, a number of political jurisdictions have begun to discourage industrial location and new investment following an implicit cost-benefit assessment that the negative environmental consequences of such investment substantially outweigh the attendant static and dynamic economic gains. Particularly affected are pollution-intensive facilities, power plants (especially nuclear power plants), highways and airports (61).

Industries that find preferred sites at home excluded for environmental reasons have available alternatives which encompass both alternate domestic and foreign locations, and there are bound to be certain international locational spillovers attributable to local or regional environmental control (62).

Although relocation of industries in developing countries is mainly based on economic grounds (availability of cheap labour, natural resources etc.), there are examples which illustrate that relocation has been essentially due to environmental factors. For example, there is a trend to locate new capacities of the Japanese aluminium industry abroad due to environmental considerations, together with the availability of raw materials and cheaper electric power in the host developing countries (61). Difficulties in finding environmentally-sound refinery sites have forced the petroleum industry to look abroad as well, particularly in Indonesia (61). In the United States of America, a trend is emerging towards relocation of industries producing asbestos, mercury, pesticides and other environmentally-hazardous substances (for example, asbestos factories have been installed in Mexico and Brazil) (63). There may indeed be instances where the relocation of polluting industries in developing countries may contribute to an increase in their GNP, but before this possibility is accepted as valid, the adverse effects of the pollution on other economic sectors and on human productivity need to be examined carefully (59).

## B. The problem

Many of the environmental effects of human activity cannot be measured in economic terms. It is, nevertheless, important to assess, in broad economic terms, at least some of the more tangible impacts that various policies have on the quality and quantity of natural resources. Such assessment constitutes an aid to judgemental decision-making. When quantification is not possible, a qualitative ranking of the various costs and benefits is helpful.

However, knowledge of many environmental effects of economic activities is inadequate, and considerable research is needed to learn more about, for example, the fate and effects of pollutants. The old adage, "prevention is better than cure", is an articulation of this need. it is generally better to spend money now to learn more about the environmental effects of pollutants, and take action on the basis of better knowledge, than to wait until the effects of such pollutants make themselves felt in the course of events and then take measures to redress the damage, if it can be redressed.

Because of the inherent complexities and interlinkages involved and the long-term implications of the process, the redeployment of industries and productive capacity on environmental grounds should be carefully assessed. Such redeployment should not be justified on economic grounds alone, but should be also based on the protection of the quality of the environment and the rational and non-wasteful use of natural resources.

## C. Major actions taken or planned

Several components of the UNEP programme are indirectly related to environmental economics (e.g. assessment of the impacts of different pollutants, environment and development, environmentally-sound technologies, etc.). More specifically, UNEP convened a series of meetings in 1979 and 1980 on the application of cost-benefit analysis to development activities in a joint UNEP/UNDP project, operational guidelines have been prepared in co-operation with FAO and other specialized agencies for a number of activities (e.g. the paper and pulp industry, coastal tourism, irrigation in arid and semi-arid areas).

OECD is especially concerned with the interaction between economic conditions and environmental policy. Currently, a reassessment of the impact of environmental measures on employment, inflation, productivity and balance of payments under present and prospective economic conditions is in progress. Internationally comparable data on pollution control expenditure in OECD member countries are being collected and analysed.

In 1980, the heads of UNEP, UNDP, the World Bank, the Commission of the European Communities, the Organization of American States and five regional development banks adopted a Declaration of Environmental Policies and Procedures Relating to Economic Development. The Declaration asserts the importance of integrating environmental measures in the design and implementation of economic development activities, of undertaking environmental cost-benefit analyses of different projects, of training and of dissemination of results of research and information on the environmental dimension of economic activities.

UNCTAD, in co-operation with UNEP, carried out a study on trade barriers and restrictions resulting from environmental policies. Site selection of industries is also under study by the UNEP Industry Programme, UNIDO, IAEA, OECD and other organizations.

## D. Concluding remarks

Available evidence shows that improvements in environmental quality have generated significant benefits without, in most cases, negative effects on the economy. The benefits of environmental policies have included reduced mortality and morbidity, improved productivity of labour, technological innovation and increased amenities.

Environmental economics is an important discipline precisely because it permits discussion of environmental problems in a language that facilitates decision-making. Most especially, it allows environmental concerns to be put on par with other concerns, and this affords a better perspective of the magnitude of such problems. There is no question, though that detailed quantification of damage and benefits in the field of environmental economics is difficult: certain issues cannot be easily quantified – the value of life being an obvious example.

Of equal importance is the difficulty of implementing environmental decisions, most especially when they bear on internationally shared resources. Transnational pollution, whether it be transmitted via international waters or the atmosphere, raises problems that are not only difficult to analyse but may lead to conclusions which are immensely difficult to implement.

The economic advantages of relocation of productive capacities for environmental reasons are likely to be fairly substantial. There will be initial capital flows, followed by the shipment of capital goods and accompanied probably by the transfer of technology and managerial skill. There will be positive employment effects in the host countries. Processing will be done closer to the source of raw materials, particularly in developing countries, resulting in a rise in the average value of exports. However, such benefits to the economy of the host country could be outweighed by over-exploitation of the natural resource and/or environmental damage. It is, therefore, important that careful assessment should be made of all redeployment opportunities to determine industrial locations that would afford advantageous growth conditions and the least degree of environmental degradation.

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# Preface

The following is a modified extract of the Report of the Executive Director of UNEP, Dr. Mostafa K. Tolba, to the tenth session of the Governing Council, scheduled for delivery in May 1982.

## INTRODUCTION

The last five years have seen a considerable change in the way in which the United Nations functions. The organization has striven to make a more effective response to the evolving needs of Member States which in the economic and social sectors have been made manifest in particular by the sixth and seventh special sessions of the General Assembly.

These assemblies were characterized by the adoption of the International Development Strategy for the Third United Nations Development Decade; by a series of global conferences, most recently those on new and renewable sources of energy and on the least developed countries; and by the continuing endeavour to launch a global round of negotiations.

The needs have thus been identified and articulated at a time when the global economy faces increasing difficulties, requiring increasing and effective international co-operation in the economic and social sectors.

The United Nations has sought to adapt its structures to these changing times.

By its *resolution 32/197*, the General Assembly set in train a restructuring of the economic and social sectors of the UN system.

Following upon other resolutions and decisions, the United Nations medium-term plan for 1984-1989, prepared in accordance with revised concepts of medium-term planning, is being submitted to the General Assembly at its thirty-seventh session.

Attempts are being made to ascribe priorities to activities in the United Nations programme budget, and to identify "activities that have been completed or are obsolete, of marginal usefulness or ineffective".[1]

These developments in the United Nations have had and continue to have implications for UNEP. In some ways they help further to refine and focus the programme's activities and its programming approach; in others they add to the workload of a secretariat whose size is already too limited to cope with substantive tasks being undertaken system-wide pursuant to Governing Council decisions.

While UNEP is a part of the United Nations, its mandate laid down by the General Assembly requires it to catalyse and co-ordinate the efforts of the United Nations system towards meeting the aspirations of the world community established at Stockholm and programme objectives set up by the Governing Council and endorsed by the Economic and Social Council and the General Assembly. Clearly there is here a delicate balance to be sought between UNEP's role as part of the United Nations and its responsibility in the system of agencies and programmes.

### *Co-ordination and Catalysis by UNEP over the past ten years*

This section seeks to review the evolution which has taken place in the exercise of UNEP's co-ordinating and catalytic role. It will be recalled that the General Assembly, by *resolution 2997 (XXVII)*, established the Environment Co-ordination Board (ECB) under the auspices and within the framework of the Administrative Committee on Co-ordination (ACC). The Board, chaired by the Executive Director of UNEP, reported annually to the Governing Council of UNEP, and was set up to "provide the most efficient co-ordination of United Nations environmental programmes".

The functions of the Governing Council include the provision of general policy guidance for the direction and co-ordination of environmental programmes within the United Nations system, and one of the responsibilities of the Executive Director is to submit to the council proposals embodying medium-range and long-range planning for United Nations programmes in the field of the environment.

The resolution also decided that the Environment Fund, in order to enable the Governing Council to fulfil the role referred to above, would finance wholly or partly the costs of the new environmental initiatives undertaken within the United Nations system.

Clearly, the General Assembly saw UNEP's influence upon United Nations programmes as central to its co-ordinating and catalytic role, and the programme document considered annually by the Governing Council rapidly became a principal vehicle for the exercise of that role.

Co-ordination is most successful at the stage of programme formulation, and the Environment Co-ordination Board, and its mechanism of focal points designated by its members was closely associated with and systematically consulted in the preparation of the relevant documents for Governing Council consideration.

In this forward-looking approach, it became important to move towards a widely shared understanding of the nature of environmental problems, including emerging ones, of the nature and effectiveness of current activities remedy those problems, and of gaps in such activities, as a basis for forward planning and for decisions on the use of the resources of the Fund.

UNEP responded by developing the "programmatic approach", approved by the Governing Council at its second and third sessions.

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[1] *General Assembly resolution 36/228A of 18 December 1981, sect.*

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In this approach, *Level One*, through its presentation of the state of the environment, sought to identify emerging environmental problems. In each priority subject area, issues were displayed in relation to the activities being implemented or currently planned to deal with them so as to identify gaps in action, in such a manner as to permit the establishment or revision of objectives and priorities and allocate responsibilities for action.

*Level Two* was the definition of a programme of action to meet those objectives, using programme framework outlining conceptual approaches, the action to be taken, and the principal actors involved, as a basis for identification and elaboration within each programme framework of specific projects.

*Level Three* consisted of actions and projects indentified within the programme framework at Level Two which were selected for support by the Environment Fund.

The programmatic approach was developed in successive years by a further refinement in the presentation of the annual state of the environment reports and by in-depth reviews in each subject area.

General Assembly *resolution 32/197 of 1977*, on the restructuring of the economic and social sectors of the United Nations system, had two specific impacts on UNEP's co-ordinating role.

First, it provided for the abolition of the Environment Co-ordination Board and its system of focal points, and the assumption by ACC of the Board's functions, including those of reporting annually to the Governing Council. ACC entrusted the Executive Director with responsibility for preparing the annual reports for its consideration, and the General Assembly subsequently stressed that members of ACC should continue to consider environmental problems at their own level.

The Executive Director instituted a mechanism consisting of the designated officials for environmental matters of members of the United Nations system, to assist him in carrying out his role in the preparation of the annual reports and other functions previously carried by the ECB focal points.

The recognition of this mechanism by the Governing Council and ACC has assisted the designated officials in playing more effectively the role of focal point for environmental matters in their own organization. There has also, given the more direct concern of ACC with the environment, been an augmentation of the Executive Director's own involvement with ACC and its subsidiary mechanisms.

Secondly, the provisions of *resolution 32/197* calling for a move to system-wide planning found a ready response in terms of the development of UNEP's programming processes. By the time of the thirty-second session of the General Assembly in 1977, the programmatic process and the in-depth reviews had led to joint programming with the United Nations agencies, and then to thematic joint programming.

With the most explicitly articulated commitment to joint planning and the greatest experience in this regard, UNEP was perhaps the best suited to move to system-wide planning in a major area.

At its sixth session, in 1978, the Governing Council decided upon the development of the system-wide medium-term environment programme as the major vehicle for the exercise of UNEP's co-ordinating and catalytic role vis-à-vis the United Nations system, with the first such programme commencing on 1 January 1984, when the programme budgeting and planning cycles of major organizations of the United Nations system would coincide.

An important aspect of the system-wide programme is that it is a basic document of interest to the governing bodies of other United Nations organizations, thus providing for a focus on environment at those forums and a means for exercising mutual influence over the organizations' planning and progamming processes.

The methodology for its preparation has been developed to facilitate the exercise of the co-ordinating role, and in particular to augment the catalytic effect of the use of Fund resources, by providing for a programme-budget type presentation for each biennium within the six-year period. Thus there is to be an amalgamation of Levels Two and Three in the system-wide programme.

The catalytic effect of the Environment Fund is apparent from the total cost — $358,411,931 — and the cost to the Fund itself — $128,244,826 — of the 727 projects, 263 of them on-going which the Fund has supported over the decade. The Fund has thus served to mobilize much greater amounts of resources than those it has itself expended on environmental activities.

The point would become even more apparent were it possible to quantify the resources in past experience, knowledge and data which the use of Fund resources mobilized.

One outstanding example is the efforts with FAO and UNESCO in regard to data on soil degradation, but there are many others. Thus the development of guidelines and methodology for the proper assessment and management has been well served by the mobilization of the United Nations system experience, at a fraction of the real cost to UNEP.

Efforts with the United Nations system are of course only a channel to an ultimate impact at the national level. Towards the end of the decade, there is increasing evidence that such an impact is being felt, and Governments are being encouraged to use their own resources for environmental protection activities.

A significant indicator is the development of environmental machinery, important in national terms but important also as a point of interaction with the UN system on

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environmental matters, benefiting from and providing a corrective feed-back for its activities.

In 1972, less than 10 Governments had established national environmental machineries; in 1981 there were more than 100.

The development of legislation at the national level, encouraged by the efforts of the United Nations system, has led to the importance now ascribed to rapid progress in the development of international environmental law, as witnessed at the recent (1981) *Ad Hoc Meeting of Senior Government Officials*, Montevideo.

Another significant indicator is the concern with the environment manifested at a very high level during official visits by the Executive Director to 70 States during the last five years. These visits appear to have a catalytic effect in focusing attention on the environment, enabling discussion at a head of state or government or ministerial level, of problems in a broader than national perspective, and have led to significant action at the national level in many cases.

Impact on public opinion has also been significant. There has been a great increase in the number of non-governmental organizations concerned with the environment (the estimate of their number has risen from about 2,500 in 1972 to about 15,000 in 1981 of whih some 2,500 are registered with the Environment Liaison Centre). Their involvement with the session of a special character of the Governing Council illustrates the nature of their involvement.

There has also been increased media coverage of the environment and of UNEP. A regular flow of information has reached the pages of the world press through press releases, feature stories, and information bulletins.

Since 1977, the regional information programme working with leverage centres such as the Press Institute of India, the Press Foundation of Asia, Earthscan and Inter Press Service has greatly increased UNEP's capacity to keep environmental topics in the news.

The number of co-productions screened on major television networks has doubled yearly. In the past 10 years UNEP, individually and jointly with other United Nations organizations, has issued 92 publications including 25 technical reports, 50 books and eight periodicals (approximately 217 issues).

The observance of World Environment Day, begun after the United Nations Conference on the Human Environment (Stockholm, June 1972), started with the use of global themes, but since 1977 Governments have been encouraged to use World Environment Day as a means of highlighting the environmental issues of major concern to them.

The tempo of the effort to seek outside resources for implementation of activities within the approved programme is increasing. The first major effort in this direction was the role of the Consultative Group for Desertification Control in the implementation of the Plan of Action to Combat Desertification.

The Group has held three sessions so far and considered a total of 39 anti-desertification projects from 23 developing countries in Africa, Asia and Latin America. No less than 37 of the projects have received expressions of support from multilateral and/or bilateral donors.

Proposals for the establishment of a special window in the Environment Fund, whether they lead to the actual establishment of a window or even an agreement on the bilateral resources which would be channelled to support relevant activities in the developing countries, represent a positive step.

Consultations with bilateral and multilateral donors have increased over the last year, and efforts are under way to present suitable activities for finance. The deployment of the UNEP secretariat's growing technical knowledge for the development and support of project proposals in developing countries is an important and growing aspect of UNEP's catalytic role.

Another aspect is the use made of UNEP as a forum where Governments can work effectively together on specific problems, and the continuing use made of the expert knowledge which the secretariat thereby acquires and can bring to bear on other similar problems.

For instance, at the regional level, the Regional Seas Programme has facilitated such co-operation. It started with a plan of action and three legal agreements to protect the Mediterranean Sea. Now, there are five plans of action with five more to come soon and eight international agreements with more to come in the near future.

At the global level, ozone is a case in point. The Governing Council called upon Governments to cut down production of the major causal factor, chlorofluorocarbons, and decided to initiate action to establish a global convention to ensure a global effort in this respect.

The occasion of the tenth anniversary of Stockholm has led to a self-examination in UNEP, review of experience to show what has worked and what has not. In retrospect, the institutional mechanism set up by General Assembly resolution 2997 (XXVII) has proved sufficiently flexible to allow an evolution of methods, from the programme as set up at the first session of the Governing Council to the system-wide medium-term environment programme (SWMTEP) being considered at the tenth.

After years in the pipeline, as it were, results at the national level are now appearing.

At the end of the first decade, UNEP has a solid foundation of experience, parallelled by the increased experience of Governments to which reference is made below. From this solid foundation, efforts can be made to enhance the effectiveness of UNEP.

## ENHANCING THE EFFECTIVENESS OF UNEP

At the time of the Stockholm Conference, Government experience in dealing with environmental problems was limited, particularly in developing countries. As mentioned in the previous section, environmental machinery now exists in over 100 countries, and the resulting experience has led to greater clarity as to the action needed at the national level as well as through and by intergovernmental organizations.

The exercise of a policy guidance role by the Governing Council could thus be performed more effectively by concentrating on policy issues and by Governments ensuring the highest possible representation at its sessions

Over the decade, UNEP itself has sought to adapt to the needs of Governments. For instance, it has gradually, and without any modification in the nature of its functions, assumed responsibility for the direct implementation of a number of activities.

At the national level this has been manifest in a larger role in the provision of support to Governments in the establishment of environmental machineries, the enactment of environmental legislation, the conduct of environmental impact assessments and the identification of national environmental problems.

At the international level, UNEP has identified issues of global significance which do not fall squarely within the mandate of any of UNEP's partners and has strengthened its own role, for example, in regard to climate impact studies derived from a decision of the Governing Council itself.

UNEP also is seized with the problems of CO$_2$ and of the ozone layer.

The Governing Council may wish to review this role and, if it sees fit, consider how the effectiveness of UNEP in this regard may be enhanced.

Equally, there is a need to strengthen UNEP's catalytic and co-ordinating role in other forums where the needs of Governments in regard to the environment are also increasingly finding expression. The negotiations for the further elaboration of the system-wide medium-term environment programme should provide one vehicle for this purpose.

The opportunity afforded by the decision of the ACC, recently commended and used as a basis for a request by the General Assembly itself, that SWMTEP should be a basic document of interest to those forums can best be exploited through special efforts at the level of those forums, by the representatives of Governments and by the Executive Director.

It should be noted that one of the responsibilities assigned to the Executive Director by the General Assembly in *resolution 2997 (XXVII)* is to advise inter-governmental bodies of the United Nations system, as appropriate and under the guidance of the Governing Council, in the formulation and implementation of environmental programmes.

The role of the environmental units in other bodies of the United Nations system could also be strengthened. The performance of UNEP's catalytic and co-ordinating role is dependent on the resources, financial and human, available to it. Consideration should be given to measures designed to ensure that adequate resources are provided.

The Executive Director considers that the points raised above, together with those emerging from consideration of the consolidated document by the session of a special character, the review of the implementation of the 1982 goals, the views of the Administrative Committee on Co-ordination on future co-operation as reflected in its report to the Governing Council, and others, could lead to a fruitful discussion by the Council which would result in the delineation of ways and means of enhancing the effectiveness of the Programme.

## THE GLOBAL ROUND OF NEGOTIATIONS

The spectrum of relationships between North and South, particularly the serious economic problems confronting the international community, was the subject of a meeting of Heads of State and Government which concluded at Cancun, Mexico, on 23 October 1981.

A summary by the co-chairmen of the meeting showed that the "Heads of State and of Governments confirmed the desirability of supporting, at the United Nations, with a sense of urgency, a consensus to launch global negotiations on a basis to be mutually agreed and in circumstances offering the prospect of meaningful progress".

All participants recognized the urgency of the situation and the importance of interdependence in terms of the functioning of their economies. They appreciated that many of the economic problems which beset them individually could only be solved through joint action and that in that sense there was a high degree of mutual self-interest involved in promoting closer international co-operation.

The meeting focused on the major issues of food security and agricultural development; commodities, trade and industrialization; energy and monetary and financial issues.

As of the time of the preparation of this report in early 1982, the General Assembly has not reached a decision on the convening during 1982 of a United Nations conference for global negotiations for development, and a resumed thirty-sixth session of the General Assembly is expected shortly. The Executive Director will bring further developments in this regard to the attention of the Governing Council through his introductory statement.

As requested by the Governing Council at its ninth session, when it reiterated its call to the Executive Director to assist in preparations for the global round, the Executive Director will be available to assist, as required, any intergovernmental machinery established by the General Assembly and to participate in any intersecretariat arrangements set up in support of the machinery.

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At its ninth session the Governing Council also stressed the need for all Governments participating in conferences and negotiations sponsored by the United Nations on other than environmental subjects to take environmental considerations fully into account; the Executive Director hopes that Governments will be in a position to act accordingly in the global round of negotiations.

## RESOLUTION OF THE ECONOMIC AND SOCIAL GENERAL ASSEMBLY

The Economic and Social Council, at its second regular session in 1981, and the General Assembly, at its thirty-sixth session, adopted several resolutions which are of direct relevance to UNEP, including *resolution 36/192* on international co-operation in the field of the environment. These are analysed in Addendum 1.

## MAJOR UNITED NATIONS CONFERENCES

The Programme of Action for the Development and Utilization of New and Renewable Sources of Energy, adopted by the United Nations Nairobi Conference on New and Renewable Sources of Energy, in August 1981, gives adequate consideration to environmental issues.

The framework for international action calls for specific programmes to promote the exploration, development and utilization of new and renewable sources of energy to take into account social, economic and environmental considerations.

The programme calls for an evaluation of the environmental impacts of the production and use of each energy source discussed, as well as an assessment and compilation of information about the impacts of energy production and use on the ecology, and invites Governments to consider energy policy in their development plans in close relation with general environmental policies. Particular attention is accorded to the problems of fuelwood and deforestation.

The United Nations Conference on Least Developed Countries saw a recognition that environmental problems such as desertification, deforestation and soil and water degradation have had direct and serious detrimental effects on the development efforts of many least developed countries.

The Substantial New Programme of Action adopted by the Conference stresses that the preservation of the natural resources available to the least developed countries is of prime importance to their future development, and that health, nutrition and general well-being depend upon the integrity and productivity of the environment and resources.

The Programme states that "fundamental to safeguarding the environment is the full understanding of the interrelationship between people, resources, environment and development. The interrelationship clearly points to the necessity of an integrated approach to development in general and development projects in particular, on the part of least developed countries themselves and external donors."

## IMPLEMENTATION OF DECISIONS OF THE GOVERNING COUNCIL

Progress in the implementation of various decisions of the Governing Council is reported upon in a number of documents before the Council at its tenth session. The present document provides information in regard to decisions included in other documents.

Action taken by the General Assembly pursuant upon Governing Council *decision 9/2* on the session of a special character is reported upon in Addendum 1. The Executive Director is pleased to report that the Government of Kenya, as the host country of UNEP, has pledged maximum support to the organizational efforts for the session. A joint committee established to co-ordinate organizational preparations has started its work.

By its *decision 9/4 paragraph 2*, the Governing Council invited the Preparatory Committee for the Second Special Session of the General Assembly Devoted to Disarmament to consider including in the draft agenda of that session an item entitled "Impact of the arms race on nature".

The decision of the Governing Council was communicated to the Chairman of the Preparatory Committee on 1 July 1981.

The Preparatory Committee has not as yet been able to give formal consideration to the request by the Governing Council. However, the General Assembly in its *resolution 36/7* on the historical responsibility of States for the preservation of nature for present and future generations, has requested the Secretary-General to complete preparation of a relevant report and to submit it to the second special session referred to above.

By *paragraph 3 of decision 9/5*, the Council requested the Executive Director to continue co-operation with the Secretary-General in his consultations with the countries concerned on the possibility of convening an international conference under the auspices of the United Nations to adopt measures for an immediate and final solution to the issue of remnants of war.

The Executive Director initiated the consultations, on behalf of the Secretary-General, through a letter sent in April 1981 to 162 Governments. Very few substantive replies were received, and the General Assembly, in its *resolution 36/188*, appealed to all States to co-operate with the Secretary-General and requested the Secretary-General to continue his contacts and consultations with Member States and report to the Assembly at its thirty-seventh session.

By *decision 9/8* on global armaments spending, the Governing Council addressed a call to Governments which was brought to the attention of all Governments through a letter from the Executive Director.

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## INTERRELATIONSHIPS BETWEEN PEOPLE, RESOURCES, ENVIRONMENT AND DEVELOPMENT

At its ninth session, the Governing Council invited the Economic and Social Council and the General Assembly to give favourable consideration to the implementation of the proposals, made by the high-level group of experts on the subject, in regard to the programme of work on interrelationships. These proposals were annexed to the decisions of the Governing Council.

In its *resolution 1981/73* on the report of the Governing Council, the Economic and Social Council endorsed these proposals in principle, invited the General Assembly to request the Director-General to provide for their implementation within the context of the programme of work to be established pursuant to *resolution 35/74,* and endorsed the important role which UNEP should assume in this regard consistent with is mandate.

In a parallel action, the Council, in its *resolution 1981/51* on the interrelationships, urgently requested the Director-General to finalize the proposals for the system-wide programme of work with a view to its full consideration by the General Assembly at its thirty-sixth session, so as to enable the General Assembly to take appropriate decisions for its implementation.

In its *resolution 36/192* on international co-operation in the field of the environment, the General Assembly at its thirty-sixth session welcomed the recommendations of the Governing Council and the Economic and Social Council concerning the system-wide programme of work and the role which UNEP should assume, and requested the Director-General to take requisite steps for their implementation.

In *resolution 36/179* on the interrelationships, the General Assembly *inter alia* requested the Director-General to initiate implementation of the programme of work, as outlined in his report, and within this framework the recommendations of the Governing Council and of the ECOSOC, and urgently to consult Governments on the elements contained in this report.

The General Assembly supported the arrangements proposed by the Director-General for interagency consultations and programme support, as well as the establishment of a small advisory body to be financed through the trust fund which has been established for financing activities concerning interrelationships, and appealed to Governments to contribute to the trust fund.

## THE ENVIRONMENTAL PERSPECTIVE

At its ninth session, the Governing Council authorized the Executive Director to consult Governments and international organizations on the desirability, feasibility and financing of various options regarding the process of preparation of the perspective document. The Council decided to give further consideration to these issues at its tenth session in the light of the Executive Director's report and the outcome of the session of a special character. The General Assembly in *resolution 36/192* stresses the importance it attaches to the development of the perspective and invites the Governing Council, at its session of special character and at its tenth session, to make such recommendations as may be appropriate. The Executive Director's report on the results of his consultations appears as document UNEP/GC.10/2/Add.4.

## IMPLICATIONS OF THE RESTRUCTURING OF THE ECONOMIC AND SOCIAL SECTORS OF THE UNITED NATIONS SYSTEM

At its thirty-fifth session, the General Assembly *inter alia* requested the Joint Inspection Unit to participate in an examination of the implementation of *resolution 32/197* on the restructuring of the economic and social sectors of the United Nations system. Accordingly, the JIU's report on the "Relationships between the Director-General for Development and International Economic Co-operation and Entities of the United Nations Secretariat" was presented to the general Assembly at its thirty-sixth session, together with the comments of the Secretary-General thereupon.

In formulating his comments upon the report, the Secretary-General sought the advice of his senior colleagues. The Executive Director communicated his views that adoption of the JIU recommendations could lead to the modification of the legislative mandates of several intergovernmental bodies established by the General Assembly, including the UNEP Governing Council. Accordingly, he recommended that the General Assembly should be requested to consider whether it would not wish to obtain the views of such intergovernmental forums before deciding upon the JIU recommendations.

The General Assembly decided *inter alia* to transmit the comments of the Secretary-General to the Economic and Social Council at its second regular session of 1982 and decided to return to the question of the interrelationships between the Director-General for Development and International Economic Co-operation and entities of the United Nations Secretariat at its thirty-seventh session in the light of the deliberations of the Economic and Social Council.

In light of the above, and given the JIU recommendation that specialized intergovernmental bodies be kept periodically informed both of progress made in the implementation of General Assembly *resolution 32/197 and 33/202* and related issues, and of any decision that may be made on the basis of the JIU report, the Executive Director invites the attention of the Governing Council to the above matter.

As regards the functions of the Director-General, it is also relevant to note that in its resolution on operational activities for development, the General Assembly has requested the Director-General *inter alia*, in his annual report on the subject, to include separately information pertaining to the Fund of the United Nations Environment Programme.

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## THE SYSTEM-WIDE-MEDIUM-TERM ENVIRONMENT PROGRAMME AND THE UNITED NATIONS MEDIUM TERM PLAN FOR 1984-1989

The proposals for SWMTEP for 1984-1989 are before the Governing Council for its consideration at the tenth session. In its annual report to the Governing Council, ACC gave its opinion as it had the year before that the programming process should be pursued thereafter, through thematic meetings as necessary, with a view to further refinement and elaboration of SWMTEP.

Accordingly, ACC recommended that the Governing Council should review the fully elaborated SWMTEP at its eleventh session.

The Executive Director considers that the proposals before the Council have been framed in a manner consonant with United Nations medium-term planning methodology. However, he recommends that these proposals be futher developed, in accordance with the concepts of variable information density approved by the Committee for the Programme (CPC), so as to present for consideration by the Governing Council at its eleventh session a detailed programme budget for the years 1984-1985 with such further information as may then be available for the two remaining biennia of the 1984-1989 period.

In order that this may be achieved, the Governing Council is expected to agree, on an indicative basis, upon the general size of resources for the period 1984-1989 which the Fund of UNEP should seek to provide in support of SWMTEP.

The Council should decide more precisely the Fund target for the biennium 1984-1985 as a basis for preparing the programme budget presentation for the first biennium of SWMTEP.

Also, in the action it takes with regard to SWMTEP at its tenth session, the Governing Council should set priorities within SWMTEP to enable a useful consultation with UNEP's partners on the most effective use which could be made not only one of UNEP resources but those of the other organizations in the UN system as well.

In this context, it should be noted that the General Assembly, in its *resolution 36/288* on programme planning, has adopted measures and guidelines for the determination of an order of priority among programmes.

Without prejudice to arrangements and procedures now in force, the establishment of an order of priority should apply to all substantive activities of the organization and serve as a guide for the allocation of all its budgetary and extrabudgetary resources. For that purpose, the decisions on priorities should be brought to the attention of Member States and relevant governing bodies.

The medium-term plan of the United Nations for 1984-1989 is to be considered by CPC at its twenty-second session in May-June 1982, and subsequently by the Economic and Social Council and by the General Assembly, later in the year. This medium-term plan should include a chapter on the proposed activities of the United Nations itself in regard to the environment.

The Executive Director considers that these activities are included in and derive from the totality of the activities of the whole United Nations system, jointly negotiated and presented in SWMTEP, which will be considered by the Council in Nairobi at almost the same time as CPC considers the United Nations medium-term plan in New York. Thus, the presentation being prepared for inclusion in the United Nations medium-term plan derives from the role and activities of the United Nations presented in SWMTEP. Relevant comments thereupon by the Governing Council will be conveyed to CPC in due course.

## IDENTIFICATION OF ACTIVITIES THAT HAVE BEEN COMPLETED OR ARE OBSOLETE, OF MARGINAL USEFULNESS OR INEFFECTIVE

A similar issue deserving Council attention is the relationship of the two presentations of (1) programme activities to the Governing Council for subsequent implementation under its guidance, and (2) some of those same activities in the United Nations Programme Budget as justification for the resources which UNEP derives from the regular budget of the United Nations.

In terms of General Assembly *resolution 2997 (XXVII)*, the Governing Council reviews the programme annually, and seeks to ensure the implementation of a balanced programme. The Executive Director functions in this regard under the policy guidance of the Governing Council whose reports are conveyed to ECOSOC and the General Assembly.

The same resolution also provides that the regular budget of the United Nations shall bear the costs of servicing the Governing Council and of providing the small secretariat referred to in the resolution, while operational programme costs, programme support costs and administrative costs of the Environment Fund shall be borne by the Fund

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A rationale for the apportionment of costs as between the Environment Fund and the regular budget of the United Nations was approved by the General Assembly at its thirty-second session. Under United Nations programme budgeting methodology, the programme budget proposals of the Secretary-General should include programme justification for the resources UNEP derives from the regular budget.

At its thirty-fifth session, the General Assembly requested the Secretary-General to identify obsolete, marginally useful and ineffective activities in the preparation of the programme budget for 1982-1983. The Executive Director pointed out that the totality of UNEP activities have been reviewed and approved by the Governing Council as recently as the ninth session, and it was thus not possible for him, functioning under the policy guidance of the Governing Council, to express views ascribing greater or lesser priority to one or another part of the programme.

However, in fulfilment of the directives of the General Assembly, and assisted by an internal secretarial group under the chairmanship of the Director-General for Development and International Economic Co-operation, the Secretary-General had formulated certain proposals in this respect.

At its thirty-sixth session, the General Assembly requested the Secretary-General to continue to provide a list of such activities and requested him also to continue to refine further, if necessary, the criteria for the determination of these activities. The Executive Director, therefore, wishes to bring the matter to the attention of the Governing Council and to seek its guidance.

The setting by the Governing Council of priorities within SWMTEP, a matter to which reference is made in paragraph 24 above, will enable him to be guided by Governing Council decisions in responding to such requirements set by the General Assembly.

## TOPICS FOR THE 1983 STATE OF THE ENVIRONMENT ANNUAL REPORT

In accordance with decisions of the General Assembly and of the Governing Council, the annual state of the environment reports are to be selective in their treatment of subject matters. It is suggested that the annual state of the environment reports should deal each year with *three topics*: two contemporary issues and one of a "futuristic" nature. For the report to be submitted to it at its eleventh session, the Governing Council may wish to choose from amongst the following topics: (a) hazardous wastes; (b) acid rain; (c) energy farms; (d) genetic engineering for food production; (e) environmental diseases: respiratory diseases.

At the inter-sessional information consultations with Governments held at Nairobi in November 1981, there appeared to be a preference for the topics of hazardous wastes, acid rain and energy farms.

*Hazardous wastes* have detrimental effects on terrestrial and aquatic biota and can reach man via different pathways with possible immediate toxicity or ill health or long-term effects (carcinogenic, teratogenic, mutagenic, etc.). Contamination of surface and ground waters and of soil by hazardous wastes has occurred in several countries. Few cases of detrimental human health effects due to toxic wastes are well known. The effects of many toxic compounds often first become noticeable in the working environment. The management of hazardous wastes (e.g. recycling, detoxification, conditioning and adequate safe disposal) has become an urgent problem not only in developed but also in developing countries. The developing of "alternative" technologies (low-waste and non-waste technologies) should be encouraged to reduce the bulk of hazardous wastes now accumulating.

The problem of *acid rain* was brought into focus at the Stockholm Conference, and in the decade that followed. It has been realized that acid rain has not only affected Scandinavian countries but also other regions in Europe and the eastern part of North America. Acid rain may be occurring in other regions of the world.

but data could be lacking. Acid rain is known to have affected surface waters and aquatic life in some areas; its effects on soil and vegetation are less well documented. Recently, several concerned countries have started to take joint action to reduce the occurrence and extent of acid rains (and consequent damage) and to tackle problems of transport of transboundary pollutants, has direct relevance to the problem of acid rains.

The term *energy farming* is now coined to mean the growing of biomass for its fuel value. Traditionally, energy farms were thought of as forests; recently, however, several alternatives have been suggested, for example, weeds, agricultural crops (especially sugar cane, corn, cassava), grasses and algae (freshwater and marine). The best known of these farms are agricultural crops and fast-growing trees (e.g. eucalyptus, ipil-ipil, etc.) Concern has been recently voiced about problems that could be introduced by such energy farms, e.g. competition for land with other requirements, and wastes produced by processing some crops (e.g. stillage from alcohol production via fermentation).

The growing demand for food and other agricultural products has triggered a great deal of research to apply *genetic engineering for food production*. It has been suggested that the "engineering" of crop plants and of the soil micro-organisms on which they depend may yield hybrid grains capable of obtaining their supply of nitrogen directly from the atmosphere.

Other lines of biological investigation may lead to the acceleration of photosynthesis or to the development of crops that can be grown on saline or highly acidic soil. Although these approaches seem to have beneficial effects, they may also have negative ones that should be carefully assessed (e.g. effects on soil, effects on atmospheric content of nitrogen, use of the technique to produce harmful higher or lower organisms, etc.).

*Environmental diseases: respiratory diseases* include black-lung disease (coal Worker's pneumoconiosis), silicosis, asbestosis, lung diseases from exposure to cotton fibres, chemicals, etc. (including lung cancer) which are common occupational diseases responsible for considerable morbidity and mortality rates among workers in developed and developing countries. Although diverse protection measures are being enforced especially in developing countries. Respiratory diseases are also associated with air pollution in industrial and urban areas (e.g. smog episodes), and several air pollution control measures have been taken in certain countries to reduce the incidence of such diseases.

## THE ENVIRONMENT FUND

At the end of the 1978-1981 medium-term plan, it is appropriate to review how far the targets set for the Environment Fund for this period have been achieved. The Governing Council set a target for contributions of $150 million. The total of contributions paid or pledged for the period was less than $125 million. There was no increase in the total annual contribution in the past three years. Taking inflation rates into consideration the real value of contributions in 1981 was significantly lower than their value in 1979.

The Fund no longer has convertible currency cash reserves beyond the requirements for three months ahead. By mid 1982, the situation will be much worse. Fund management in 1982, given the uncertainties that surround the timing of payments of new contributions will be very difficult. The Fund programme for this year will be based, to a large extent, on expectations of new contributions rather than on reasonably valid estimates. Planning a programme for more than one year ahead is virtually impossible.

At the same time, with costs rising steadily since 1978, it has been inevitable that Programme and programme support costs have taken a greater share of available resources. The Governing Council has indicated its desire to see Programme and programme support costs budget held to a level approximately equal to one third of new contributions. Unless contributions rise or world inflation is held at reasonable levels, this can only be achieved by reducing the staff of UNEP to a level at which its capacity to plan and co-ordinate the global environment programme is seriously undermined.

The Executive Director has had to freeze 20 per cent of all professional posts financed under the Programme and programme support costs budget and almost similar percentage of projects posts. But, if pledges for contributions do not rise above $30 million per year the Executive Director will need guidance from the Governing Council as to what further steps should be taken.

# PART TWO: UNEP AT WORK

IN THIS section there is emphasis on the actual work of UNEP during 1981, rather than on explanations and justifications of that work. An outline of the activities of the organization is provided, together with details of the cost of each programme and project. In addition, there are short chapters on the information, education and statistics services of UNEP, and a review of the operation and expenditures of the Environment Fund during the year.

The text of these chapters has been prepared for a general audience and is an interpretative summary of UNEP's wide-ranging activities by the Information Division. A more scientific approach and a more detailed account of the scientific accomplishments of the Programme are contained in other UNEP publications and documents.

# Environmental Monitoring

THE contribution of UNEP's Global Environmental Monitoring System (GEMS) is in improving the quality, quantity and flow of information on the varying state of the earth's environment.

Its specific aims are to collect data through an internationally co-ordinated effort; to collate and evaluate data using a wide range of technologies; and to assess environmental problems in respect of human health, climate, oceans and renewable natural resources, including soils, forests and rangelands.

The GEMS Programme Activity Centre (PAC) in UNEP is responsible for bringing the combined efforts of a number of international organizations to bear on the establishment of monitoring activities, with the exception of those related to oceans (see below). Its achievement is in the degree of co-operation it has brought about and the information on the state and trends in the environment that the resulting data provide.

*Specific activities co-ordinated by the Unit in 1981 include the following:*

### Resource monitoring

- With FAO, world-wide assessment of tropical forest resources with data obtained from published and unpublished records, verified where necessary through the analysis of images obtained from earth resource assessment satellites. The surveys of Africa, Latin America and Asia have been published. The final global assessment will be available in early 1982.
- A separate detailed pilot study of tropical forest cover in three West African countries, also carried out in co-operation with FAO, devised methods for the inventory of forest cover using various combinations of satellite image analysis, survey by aircraft and detailed investigations on the ground. The methods are inexpensive and very cost effective. The programme is currently being expanded into other regions — initially Asia.

- Ecological monitoring of tropical pastoral ecosystems using a mix of remote sensing imagery from satellites, systematic observations from low-flying aircraft and ground surveys, is well under way in Senegal. The project which encompasses a 30,000 km $^2$ rangeland area, has already provided the Senegal Government with accurate and up-to-date information, *inter alia*, on vegetation cover, soil conditions, stocking densities, population distribution and availability of water resources that had not before been available. This joint UNEP/FAO/Senegal project continues with assessment of the same variables and their reaction under different seasonal conditions. Similar projects in other parts of the world are being developed.

### Overall results

The results indicate that the global loss of forest is serious, but not as rapid as previously thought *(See Fig. 1)*. Some national situations, however, are acute — of the 76 countries covered by the assessment, some nine will have lost all or most of their forests by the year 2000. These countries are relatively small however, and contain only 15 per cent of the world's closed forests.

The Conservation Monitoring Unit, at Cambridge, UK, is responsible for assembling data on the state of threatened species of plants and animals, and on threatened habitats throughout the world. This unit, developed with IUCN and WWF, is building up a complete data base in order to provide species and habitat state assessments as required.

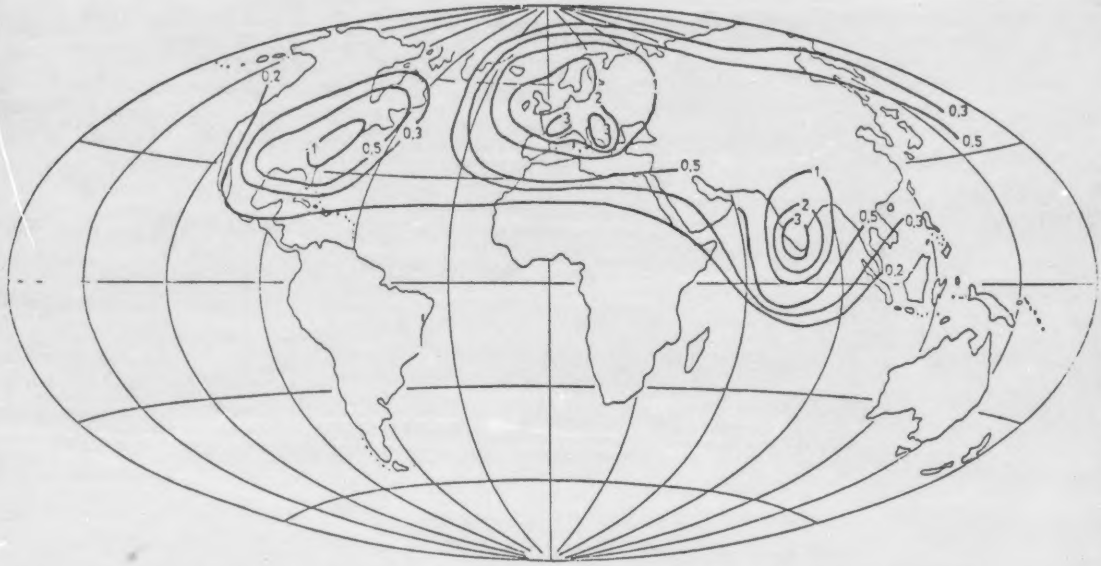
It is envisaged that the data so far obtained in the area of renewable resource monitoring will be reviewed and assessed by a Government Expert Group in 1983.

### Climate-related monitoring

A background air pollution monitoring network of approximately 100 stations continues to investigate and provide information on long-term changes in the composition of the atmosphere resulting from human activities. These activities — together with a world-wide inventory of glaciers,

# Environmental Monitoring

# Environmental Monitoring

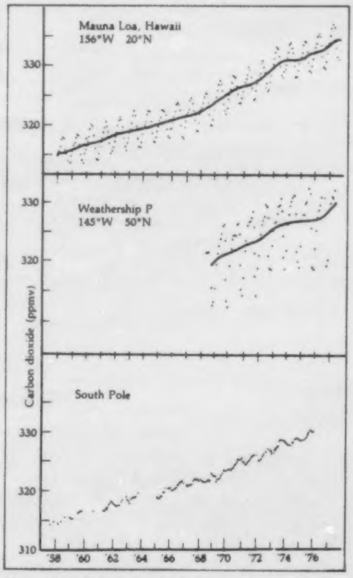


gathering a considerable amount of data on glacier surfaces and masses from most glaciated countries — are now part of a comprehensive project on climate-related monitoring (UNEP/UNESCO/WMO). The project also provides for the collection of such data as the extent and variations of sea ice and snow cover, the reflectivity of the earth's surface, the ocean surface temperature, and historical data on climate.

In 1982, a Government Expert Group on Climate-related Monitoring will review and assess the data thus far obtained.

### Ocean monitoring

Current activities in this field are now co-ordinated by the Regional Seas PAC.



*Upward trend in atmospheric $CO_2$ as shown at three stations in the GEMS monitoring network.*

### Health-related monitoring

Data resulting from the monitoring of air pollution in urban areas have been published with details on the quality control procedures used. Two hundred stations in 50 cities have so far been involved in this activity which is continuing to expand. The project is being carried out in co-operation with WHO and WMO; data for 1979 will be published in 1982:

- a monitoring project on food contamination by chlorinated hydrocarbons and selected metals provided in 1980 data over several years in 19 countries. Additional data collected with closer attention to quality control will be published in 1982;
- a water quality monitoring network which will eventually comprise some 400 stations is regularly producing data for publication;
- pilot projects on the assessment of human exposure to air pollutants and on the assessment of exposure through analysis of human tissues and body fluids will be completed by mid-1982;
- in early 1982, a Government Expert Group on Health-related Monitoring will review and assess the results of this group of projects.

Health-related monitoring projects are

# Environmental Monitoring

conducted in co-operation with WHO as lead agency. FAO, UNESCO and WHO also participate with UNEP in their respective fields of competence.

**Long-range transport of pollutants**

Further activities arise from concern in certain European countries over "acid rains" due to emissions of sulphur and nitrogen oxides. A study of wet and dry precipitation chemistry, in co-operation with the ECE, includes analysis of samples obtained from 60 stations in 16 countries. The atmospheric transport of air masses over Europe is studied by East and West European Centres located in Moscow and Norway and co-ordinated by WMO.

The results of the programme were reviewed and assessed by its Steering Body in 1981.

| **PROJECTS — 1981** | **Cost to UNEP (US dollars)** |
|---|---|
| • Management of Global Environmental Monitoring System (GEMS | 537,55.77 |
| • Monitoring of Background Pollution in the Atmosphere (Phase II) | 878.00 |
| • Air Pollution Monitoring | 41,063.00 |
| • Joint FAO/WHO Food and Animal Feed Contamination Monitoring Programme (Phase II) | 52,903.00 |
| • Global Water Quality Monitoring System | 81,496.00 |
| • Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe | 109,973.00 |
| • Establishment of a Background Soil Pollution Monitoring System in Romania | 1,105.69 |
| • Pilot Project on the Assessment of Human Exposure to Air Pollutants | 12,461.00 |
| • Tropical Forest Resources Assessment | 9,457.10 |
| • Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (Meteorological part—West European Centre) | 50,000.00 |
| • Pilot Project on Assessment of Human Exposure to Pollutants through Biological Monitoring | 57,184.80 |
| • Pilot Project on the Inventory and Monitoring of Sahelian Pastoral Ecosystems | 58,197.70 |
| • Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe | 39,995.82 |
| • Climate Related Monitoring | 126,071.00 |
| • United Nations Seminar on Remote Sensing Applications in Geology and Hydrology (Baku, USSR, 17-28 Nov. 1980) | 83,981.16 |
| • Review of Climate Related Monitoring | 23,537.00 |
| • The Use of Modern Remote Sensing Techniques in Monitoring Desertification of Natural Resources in Egypt | 100,000.00* |
| • Monitoring and Assessment Research Centre (MARC) | 95,876.57 |
| • Review of Health Related Monitoring | 50,000.00* |

*Commitments

# Infoterra

The International Referral System for Sources of Environmental Information (INFOTERRA) is a network of partner countries which respond to requests for environmental information through established national Focal Points (NFPs). In 1981, at the close of its fifth year of operation, INFOTERRA had grown to a network of 115 NFPs, of which 93 were in developing countries.

The *International Director of Sources*, published biennially with six-monthly supplements, is issued in English, French, Russian and Spanish by the INFOTERRA Programme Activity Centre (PAC) in Nairobi. In it are listed 9,100 sources from 82 countries for information on over 1,000 environmental topics. Nearly one-third of these source are in developing countries.

The world-wide use of the system has increased to approximately 400 queries per month, with just over one-half of these coming from developing countries.

INFOTERRA is thus responding to an increasing world demand for accurate, relevant information needed for sustainable development, including environmental planning, technology and science. Its achievement has been to improve the quality of decisions on environmental issues, and to provide easier access to current knowledge.

As originally planned, the network of INFOTERRA focal points acts as a "switchboard", connecting enquirers with potential sources of information relevant to their needs. When contacted, these sources supply appropriate substantive information and documentation. Among its main functions, INFOTERRA attempts to:

- promote greater co-operation between institutions and nations in the collection, evaluation and distribution of environmental data;
- educate decision-makers on the need to incorporate environment-related information in development planning;
- help develop national systems for the retrieval and processing of environmental information; and
- develop the referral service itself, with the identification of more sources of information and with the expansion of the NFP network.

**The ninth session of UNEP's** Governing Council, held in Nairobi in May this year, was of particular significance for INFOTERRA's future development, as delegates were able to discuss and comment upon the findings of an independent evaluation of the network, carried out under the auspices of the UNISIST programme of UNESCO.

The evaluation report noted in its summary: "It can be said that the original mandate has been fulfilled... INFOTERRA has had some success in stimulating an awareness of environmental problems, and the value of information in meeting them, and has contributed to the development of national capabilities for handling environmental information."

Among recommendations for the phased expansion of INFOTERRA made in the report was a call for network partners at the national level to move beyond the provision of referral services only, towards the supply of some substantive information to users.

The Governing Council gave strong support and endorsement to the recommendations made in the evaluation report and encouraged all Governments to make adequate resources available to their respective national focal points so as to enable them to expand their activities. The PAC was requested to establish appropriate procedures and to arrange for the further training of NFP staff in implementing these.

## The global switchboard

As noted in the evaluation report, INFOTERRA "provides access to unpublished information or information and expertise which is otherwise difficult to acquire. It operates at low cost to the user, and is of direct value in promoting international relationships."

An example of the effective use of INFOTERRA's world-wide network in facilitating the exchange of environmental "know-how" came this year from China. A research worker at the Institute for Labour Protection needed information for developing a set of national standards for the colouring of safety signs in the working environment. This involved assigning particular colours to those features requiring specific safety measures.

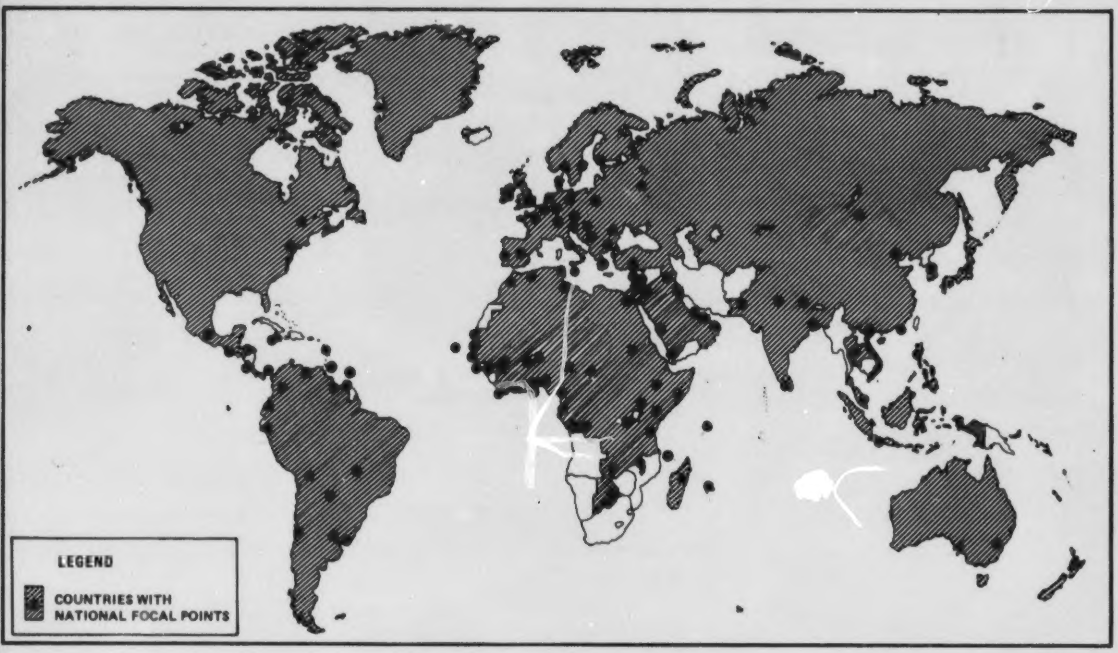
The researcher approached the INFOTERRA NFP in Beijing for assistance in finding the information she required. Following a search of the International Directory, the NFP provided her with a list of likely sources, both within the country and abroad. On contacting these INFOTERRA sources, she obtained some 20 documents presenting information which was of very high quality and directly relevant to her investigations. The materials received included proposed national safety codes from Australia, safety codes and colouring standard sample cards from the US, as well as similar materials from the UK and Japan.

The Institute for Labour Protection was then able to design and propose China's first set of national standards for safety colouring and labelling and 109 prototype signs were produced for testing among various labour groups. Safety standards throughout the country are expected to be improved as a direct result of this process.

Two earlier user-source connections established by INFOTERRA also served to illustrate the network's potential for streamlining the flow of information-exchange on environment issues.

When Indian government officials were asked by the Prime Minister to draw up legislative measures and devise administrative machinery for environmental protection, they turned to INFOTERRA's New Delhi focal point for assistance in obtaining substantive information on the procedures established elsewhere. A total of 14 separate sources around the world responded to a list of queries sent out by the Indian NFP, providing as much as 80 per cent of the information on environmental machinery, and, subsequently incorporated into the

# Infoterra



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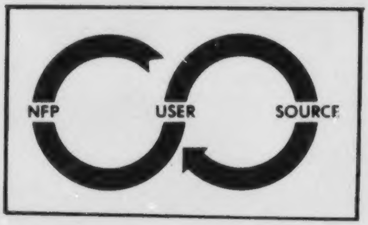
government's recommendations for setting up a new Department of the Environment.

INFOTERRA's far-flung global resources were also put to the test when 12 journalists in different parts of the world posed identical questions to their respective NFPs. An independent analysis of the responses to this exercise carried out by EARTHSCAN showed that even specialists could expect to find new, useful data through using the system.

From the start, INFOTERRA was designed to be highly flexible. It permits many different types of information to be made accessible to users, and it can be used at very different levels of information technology. Although every focal point has the tools and the training to locate sources manually, using the printed directory, an increasing number of focal points have access to computer systems on which INFOTERRA searches can be carried out mechanically. Computer programmes tailored to suit the particular needs of each individual focal point are supplied by the PAC, together with assistance in installation and initial operation.



For NFPs which do not have easy access to a computer, two intermediate alternatives have been made available. First, queries can be mailed, cabled or telephoned to the INFOTERRA PAC in Nairobi, which will process them and telex back the search results.

Second, especially when a query requires more urgent handling, those NFPs with direct-dialing telex connections with Switzerland can obtain direct access to INFOTERRA's computer facilities in Geneva, through a new computer-telex system which was introduced during the year. Installation of special equipment and software on the Geneva computer now allows it to accept queries in standardized telex format, to process the search and produce a list of relevant sources, and then to 'dial' the international telex number of the requesting NFP and send back a reply —all within half an hour.

This direct-dialling telex facility is available temporarily on an experimental basis; more permanent solutions will involve the development of regional networks of national centres offering computer search services to others in their area, and the use of improved global telecommunications channels.

### Specific activities in 1981

The Nairobi PAC's activities during the year were inevitably concentration on implementation of the evaluation report's recommendations for the future development of the network.

A Terminology Task Force meeting was held in Nairobi, 16-20 November, in order to define a clear and unambiguous strategy for improving the list of attributes (key-words), which serve as a "controlled vocabulary" to describe the subject area of expertise or information held by sources and for coding queries and searches. After conducting a detailed study of the current attribute list, the Task Force agreed on a set of criteria for future use in the revision of terminology and proposed a detailed plan for the revision of the present INFOTERRA attributes, which is expected to be completed by mid-1982.

Representatives of 39 African NFPs met in Nairobi during 25-27 November, to discuss regional co-operation and the expansion of INFOTERRA services beyond referral. A number of suggestions were made for sharing resources, including offers by NFPs with computers to provide search facilities for other NFPs in the region.

Network operations can also be expected to be strengthened as a result of two other meetings held during the year. An INFOTERRA seminar for government officials from 15 developing countries, organized by the GDR NFP in Dresden on 28 April, demonstrated telex-searching facilities using a direct link with the Geneva computer; and a development workshop for Caribbean NFPs in Kingston, Jamaica from 31 August to 4 September, resulted in the launching of a pilot programme for the improvement of national operations.

Training courses for both English and French-speaking NFPs were held in Nairobi and Dakar, and four national seminars were organized by the respective NFPs in Byelorussia, Congo, Nigeria and Uganda.

The PAC compiled three new specialized directories during the year. **New and Renewable Sources of Energy** was published as a resource book on the occasion of the UN Conference on New and Renewable Energy Sources in Nairobi, in August. A year after the launching of the World Conservation Strategy, at the fifteenth General Assembly of the IUCN, INFOTERRA presented a similar document on *Conservation for a Sustainable Development*. And to mark the *UN Drinking Water Supply and Sanitation Decade*, a specialized directory of information sources on this theme was compiled for publication early in 1982.

*On-going activities*

- providing referral services to users;
- further expansion of the network;
- training and technical assistance to NFPs;
- publication of the International Directory, specialized directories, and the INFOTERRA Bulletin;
- co-ordination of promotion activities within the network;
- implementation of Evaluation Report recommendations;
- revision of the INFOTERRA attributes list.

**PROJECTS — 1981**

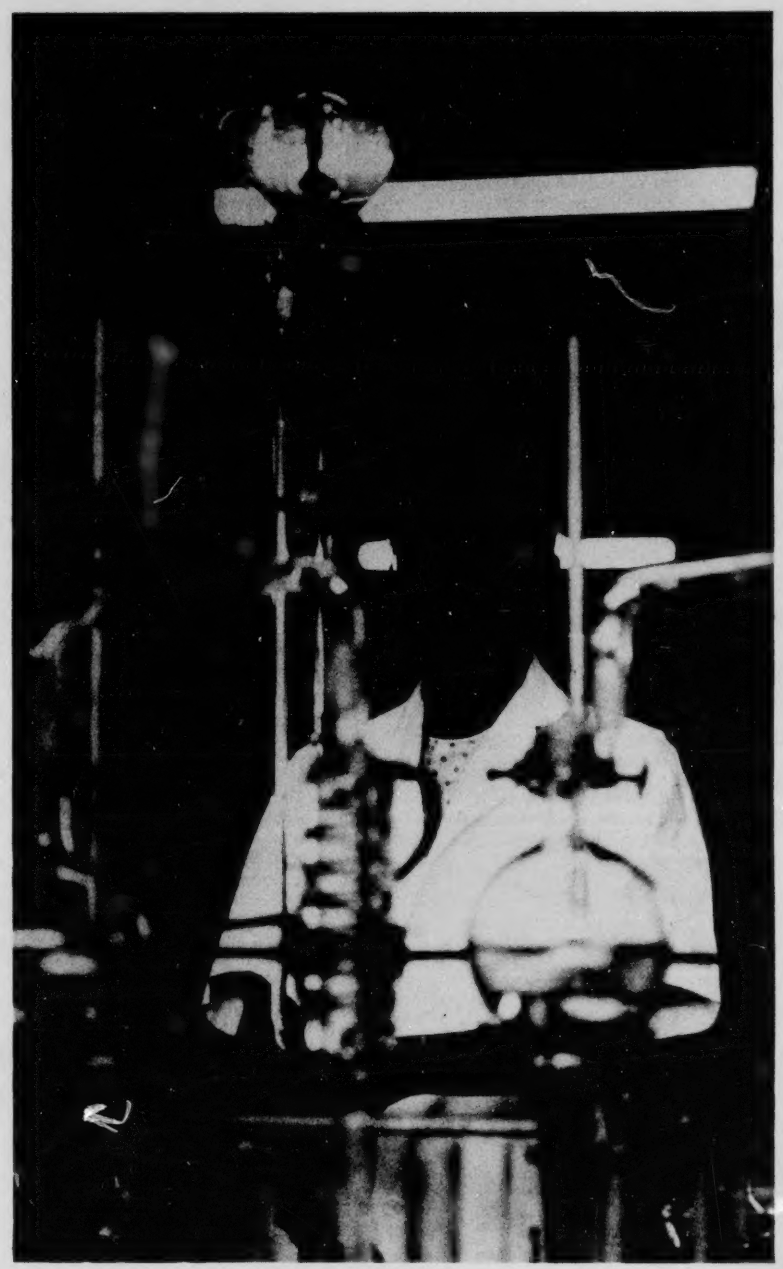
| | **Cost to UNEP (US dollars)** |
|---|---|
| • Development of Inter-organization and Inter-disciplinary Data: Information | 7,756.00* |
| • INFOTERRA Programme Activity Centre (Operational and Evaluation Phase) | 929,949.87 |

*Commitments

# Chemicals in the Environment

THE International Register of Potentially Toxic Chemicals (IRPTC) entered its operational phase during 1981 by starting a massive programme to collect and disseminate data on over 300 chemicals included in its Working List of Selected Chemical Substances.

Network partners from Governments, academic and industry have been invited to contribute data to the Register that is now being computerized, making use of the United Nations computer facilities in Geneva where the Programme Activity Centre is based. Regular publication of IRPTC Bulletins and other technical documents is an important component of IRPTC's information dissemination activities. Working relationships with national correspondents and other contributing network partners are gradually expanding and becoming increasingly effective.



## Background

In the last few decades, man's dependence on synthetic and naturally derived chemicals has increased dramatically. At the present time, more than 50,000 chemicals are found on the world market and an estimated 500-1000 new chemicals are introduced annually into industry, agriculture and several sectors of domestic life.

It is abundantly clear that chemicals bring big benefits, and the chemical industry is of enormous importance to many countries. But unless the effects of chemicals are carefully monitored and their use is carefully controlled, they can also result in serious damage to the health of workers and their families, the public at large and to the natural environment. If the hazards they bring are not to outweigh the benefits they bestow, then the environmental and health impacts of chemicals used in industry, agriculture, forestry and public health projects, as drugs, food additives and cosmetics, and a host of other applications, have to be critically and objectively assessed.

Most important, the results of such assessments, some of which remain exceedingly difficult to perform, must

# Chemicals in the Environment

be widely and accurately disseminated to all actual and potential users.

Governments should also have easy mutual access to the results of national decision-making processes on chemical safety issues, in particular regulatory control of hazards from chemicals. To date, this global communication of the results of chemicals testing and monitoring has not been achieved in a satisfactory way. The relevant data, where it existed at all, was often scattered between various research institutions and agencies—some of it published, some not—out of reach of many organizations for which access to it could prove vitally important. It needs to be assembled for application in hazard assessment and subsequent decision-making, and to be widely disseminated thereafter, and this is broadly the mandate of the International Register of Potentially Toxic Chemicals.

The main principles that have guided IRPTC since its inception are:

- It should enhance the ability of the United Nations system to increase awareness and provide advance warning of deleterious effects to human health and well-being from man-made pollutants;
- the content, scope and operation of the Register should be so organized as to fulfil the information requirements of world-wide users, in particular policy-makers at the national level;
- it should be built on existing and planned national and international systems and it should be able to request information from those systems which have chosen to co-operate with IRPTC;
- Governments and organizations wishing to contribute to IRPTC should be prepared to establish and maintain the necessary mechanisms for such interaction.

**National correspondents**

During the early days of IRPTC, steps were taken to establish contacts with UN Member States by inviting national Governments to designate National Correspondents for IRPTC. Today more than 90 countries have nominated a National Correspondent and many of them are already actively involved in data and information exhange. Regional workshops are being held to familiarize National Correspondents with the operation and use of the Register.

**Working linkages**

Working relationships have been established with numerous UN, intergovernmental and non-governmental organizations with a common interest in chemical safety. In particular, close working links have been set up with the International Programme on Chemical Safety (IPCS) in which ILO, WHO and UNEP co-operate.

Moreover, in order to produce data profiles—integrated condensed packages of information on chemicals—using the most reliable and complete information, IRPTC is developing working relationships with "Network Partners". From the beginning of its activities, IRPTC has considered the identification of network partners and the implementation of effective collaboration with them as a priority task. The potential partners can be identified as:

- the IRPTC National Correspondents;
- some national and international institutions; and
- industries and external contractors.

In collaboration with IRPTC on the data collection undertaking, the Contributing Network Partners can play a very important role by ascertaining the completeness, accuracy and precision of the information collected.

**Specific activities in 1981**

- Preparation and review of data profiles on over 300 chemicals from the IRPTC Working List of Selected Chemical Substances with the aid of National Correspondents, some national and international organizations, consultants and subcontractors;
- implementation of a data base management system and query language for computerized storage and manipulation of the IRPTC data base;
- review and refinement of instructions for use by the IRPTC network for selecting data from published scientific, technical and legal literature for the attributes adopted by IRPTC and presentations in a condensed and readily usable form. This activity included consultation with the Working Group on Environmental Pollutants of the IUCN Commission on Ecology for improvement of selection procedures for environmental data on chemicals;
- Publication and/or preparation of:
  - – the regular IRPTC Bulletin in English, French, Russian and Spanish;
  - – data profiles for most chemicals of the IRPTC Working List of Selected Chemical Substances;
  - – comprehensive data profiles on cadmium, lead and tin;
  - – a Register Index indicating chemicals on which data profiles exist, and the data fields on which data have been entered;
- A Workshop for National Correspondents in the Latin America Region (*Mexico City, November)* as the third in a series of regional workshops to familiarize National Correspondents with the use of the Register and to train them to become actively involved in IRPTC operations;
- continuing co-operation with National Correspondents to establish the National Register of potentially toxic chemicals and to develop a common format compatible with the IRPTC central files;
- continuing development of the National Correspondents network and of working contacts with potential contributing network partners;

35 35

# Chemicals in the Environment

- continuing operation and strengthening of the Query-Response Service through expansion of the IRPTC's computerized documentation system, with assistance as necessary from national and international institutions, the National Correspondents network and through access to on-line computerized bibliographic information systems;
- strengthening of contacts with the International Programme on Chemical Safety and active participation in some of its projects; further implementation of the External USSR/UNEP Project on "Control of Hazards Posed by Chemicals to Human Health and the Environment" to privide for collection and dissemination of information on chemicals, organization of international workshops and meeetings on selected topics related to control of chemicals, carrying out post-graduate training of students from developing countries on various problems of toxicology, chemical hazard control and standard setting, and translation and printing of reference documents on chemicals as well as the IRPTC Bulletin and other relevant documents;
- 'an expert meeting was held in Leningrad, USSR, from 22-27 June 1981, to discuss basic principles of definition of toxicological and safety data for chemical substances in international trade, to make recommendations and to approve a draft document on this particular question. The final report was distributed among IRPTC National Correspondents, some international and intergovernmental organizations and some representative chemical industry bodies for study and comment;
- work on a bilingual glossary of basic terms related to toxicology and environmental effects of chemicals was continued;
- reviews of scientific literature and legislative documents on 20 selected chemicals were prepared for inclusion in the IRPTC data bank;
- a ten-month post-graduate training course for six students from developing countries is nearing completion;
- Continuing work with other UNEP units, and in close co-operation with the WHO Regional Office for Europe, in preparing Policy Guidelines and a "Code of Practice for the Disposal and Transfrontier Transport of Hazardous Waste";
- initiation of a project, in accordance with a decision of the Governing Council of UNEP, to prepare a short list of environmentally dangerous chemical substances, of global impact;
- continuing co-operation with ILO in the phased development of an "International Occupational Safety and Health Hazard Alert System", and in the preparation of a compilation of national occupational exposure limits for airborne toxic substances, involving 20 countries;
- Continuing work with ECDIN, the data bank on chemicals currently being implemented by the Commission of the European Communities, on systems compatibility and exchange of data;
- further co-operation with the Chemicals Group of the OECD on information exchange procedures, a chemicals testing programme, and a special programme on the control of chemicals.

| **PROJECTS — 1981** | **Cost to UNEP (US dollars)** |
|---|---|
| • International Register of Potentially Toxic Chemicals (IRPTC) Phase II | 792,250.35 |
| • Control of Hazards Posed by Chemicals to Human Health and the Environment | 154,885.37 |

# Outer Limits

## CLIMATE

MANKIND has adapted his activities to take advantage of his climate environment for his survival and well being. However, climate is subject to variations which at times can be so severe as to cause major societal disturbances; drought, floods, tropical storms are examples that regularly result in famine, destruction of habitation and loss of life.

In addition to natural climatic variations, there may eventually occur a change to a different global climate from that which presently exists as a result of the emission to the atmosphere of carbon dioxide from the burning of fossil fuels, other trace gases and particulates. Present scientific opinion is that average temperatures could rise in the next century by several degrees which will in turn alter rainfall and wind regimes with consequent impacts on agriculture and other sectors of human activity.

UNEP, through its World Climate Impact Studies Programme (WCIP) — a part of the World Climate Programme — has been charged with the assessment of climate impacts. Knowledge of the nature and scale of climate impacts will help to decide which climate problems deserve priority attention and at the same time allow society to make better use of climate as a resource, thus providing the basis for consideration of alternative policy actions to prevent or ameliorate unfavourable impacts and take advantage of benefits that may occur as a result of climatic change.

A five element plan of action has been recommended by the UNEP Scientific Advisory Committee to the WCIP and approved by the Governing Council at its ninth session. The following activities under this Plan are already in the process of implementation by UNEP:

- a joint project with UNRISD to reduce the vulnerability of food systems to climate in north-eastern India. Similar proposals concerning food and drought in Mexico and China are under consideration for inclusion in the UNEP programme;

# Outer Limits

- with UNEP support, the Scientific Committee on the Problems of the Environment (SCOPE) held a meeting of authors at Toronto, Canada in September 1981. These authors are to prepare 24 overview papers on improving the science of climate impact studies. After review, these papers will be compiled and published in late 1982. Copies of the book will be made available free of charge to scientists in the developing countries working on climate impact assessment;
- UNEP has co-sponsored — with WMO and other international organizations — a regional technical conference on climate for Africa, held at Arusha, Tanzania in January 1982. The problems of data quality and availability, water resources, agriculture and food, energy and education and training were discussed as they relate to the climate data and applications programmes of WMO and the climate impact programme of UNEP. The report contains a list of priority recommendations on these subjects;
- in a major co-ordination exercise, UNEP is identifying all climate impact studies or related activities being carried out world-wide. The plan is to publish a list of these activities and subsequent analysis should reveal areas where better co-ordination is required.
- UNEP is promoting the establishment of correspondence groups of scientists and institutions so as to promote an exchange of ideas on climate-related activities. A first group will address the problem of interface of climate prediction models and of crop-climate models in order to improve the impact assessment of climatic change;
- a major emphasis is to be placed on the assessment of $CO_2$-induced climatic change. UNEP plans a series of activities for the forthcoming year including a meeting of experts in Austria and the establishment of a Co-ordinating Committee on Carbon Dioxide to oversee the continued assessment of the $CO_2$ problem.

# Outer Limits

### Weather modification

UNEP continued its support of the WMO Precipitation Enhancement Project (PEP). The third and final phase of site selection has been completed in Spain and a decision on the suitability of the site for initiating a cloud-seeding experiment will shortly be made. UNEP's special concern in this project is the assessment of the extra-areal environmental consequences of weather modification activities.

The Draft Guidelines for National Legislation concerning Weather Modification prepared by UNEP and submitted to governments for their use have been generally well received.

### Ozone layer

A fifth meeting of the UNEP Co-ordinating Committee on the Ozone Layer was held at Copenhagen, Denmark from 12 to 16 October 1981. Major advances have now been made in the understanding of the chemistry of the ozone layer and those chemicals, principally chloroflourocarbons (CFCs) 11 and 12, suspected of having a depleting effect on the stratospheric ozone layer. The meeting concluded that a risk to the ozone layer still existed as a consequence of chemical emissions to the atmosphere and it was calculated that an eventual ozone reduction of somewhere between 5 and 10 per cent would occur if CFC 11 and 12 releases continued at their present rates. If releases of other chlorine-containing compounds are also continued at present rates, then they could increase the eventual ozone depletion due to CFC 11 and 12 alone by about one third.

Depletion of the atmospheric ozone layer will allow an increase in certain wavelengths of solar ultraviolet radiation (UV-B) reaching the earth. Most of the known effects of UV-B are damaging effects, so there is concern for the consequences, especially with regard to agricultural production, fisheries and human health. Terrestrial plants including important crops and aquatic organisms may undergo damage by increased UV-B and it is well established that it would also lead to an increased incidence of non-melanoma skin cancer especially in light-skinned people. In addition, there are indications that sunlight may be one of the causative factors of malignant melanoma.

In view of the above, there is presently considerable support for action to protect the ozone layer from damage. At its ninth session, the Governing Council decided to initiate action aimed at the elaboration of a global framework convention for the protection of the ozone layer. For this purpose an *ad hoc* working group of legal and technical experts was established by UNEP and the group was scheduled to meet at Stockholm in January 1982. A plan of work leading to the development of the framework convention was to be decided and the Executive Director will report on progress made at the tenth session of the Governing Council in May 1982.

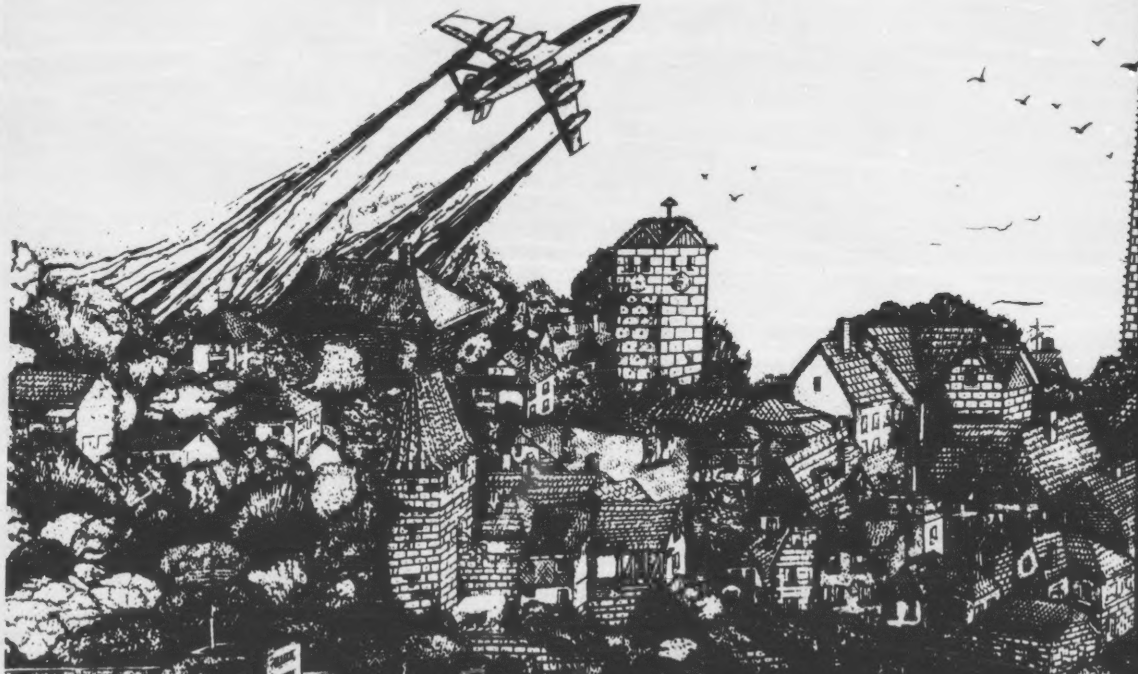
The sixth edition of the Ozone Layer Bulletin containing the environmental assessment of ozone layer depletion and its impacts was published in January 1981 and UNEP is presently compiling information on the production, production capacity and use of CFC 11 and 12 and other substances identified as possibly having an effect on the stratospheric ozone layer. This information will be published in a future edition of the Ozone Layer Bulletin.

| **PROJECTS — 1981** | **Cost to UNEP (US dollars)** |
|---|---|
| • Precipitation Enhancement Project Pre-Programming Activities | 1,933.67 |
| • Meeting of the Consultative Committee on Ozone, 1-3 November 1977 | 20,542.93 |
| • Co-ordinating Unit for the Biogeochemical Nitrogen Cycle | 1,760.61 |
| • Studies in Photosynthesis in Relation to Bioproductivity | 76,530.54 |
| • Co-ordination of International Programme on Global Biogeochemical Sulphur Cycle and the Influence on it of Human Activities (Phase I) | 7,073.00* |
| • Global Ozone Research and Monitoring Project—Phase II | 39,582.00 |
| • Co-ordinating Unit for the Carbon Cycle (CUCC) | 112,500.00 |
| • Climate Impact Studies | 38,878.21 |
| • Research and Monitoring of Atmospheric Carbon Dioxide — Phase I | 17,00.00* |
| • Climate Conference for Asia and Western Pacific and Climatic Atlas of Asia | 36,020.67 |
| • Improving the Science of Climate Impact Study (Phase I) | 25,000.00* |
| • Co-ordination of International Programme on Global Biochemical Sulphur Cycle and the Influence of it on Human Activities — Phase II | 21,800.00* |

* Commitments

# Outer Limits

# Outer Limits



# Human Settlements

CO-OPERATION in the area of human settlements has continued both with Habitat (UNCHS) and other agencies, notably UNESCO, WHO and ILO.
At its fourth session, the Joint Bureaux Meeting reviewed the collaboration between UNEP and UNCHS and emphasized the need to undertake practical activities applying known knowledge to the *solution* of critical environmental problems.

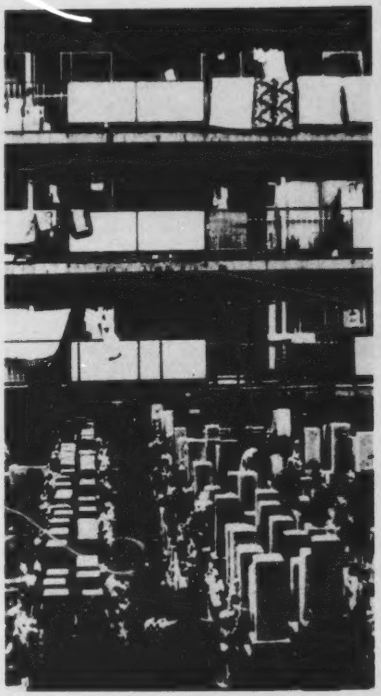
**Specific activities in 1981**

Two activities of major significance are the initiation of a project on guidelines for the environmental aspects of human settlements planning, and a project on preparing a methodology for environmental impact assessment of large urban areas—the latter to be tested in the valley of Mexico City.

The Task Force on Human Settlements participated in two expert group meetings convened by UNCHS. These were on: *Appropriate infrastructure for slums and squatter settlements* and *Development of the indigenous construction sector.*

**Other activities included:**

- refinement of the human settlements chapter of SWMTEP;
- preparation of a report on *Environmental Aspects of the Building Materials and the Construction Sector;*
- preparation of a report on *Solid Waste Management in Slums and Squatter Settlements.*



**PROJECTS — 1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| • Integrated ecological studies on human settlements as a basis of decision-making and with special reference to interactions between human settlements and their surrounding environments and to the problems of energy flow | 8.589.31 |
| • Assistance to the Capital Development Authority, Dodoma, Tanzania | 44,710.24 |
| • Preparation of guidelines on environmental aspects in the planning and management of human settlements (Phase I) | 49,200.00* |
| • Integrated approach for improving slums and marginal settlements demonstration projects in the Philippines | 68,252.15 |
| • Urban Environment and Urban Employment in Developing Countries | 10,000.00 |

# Human and Environmental Health

THE UNEP Task Force on Pollution and Human Health works closely with Governments and a number of UN bodies, notably WHO, FAO, ILO, IAEA and UNDP. It makes contribution towards the UN Global Strategy of Health of All by the year 2000, and the preservation of the environment for the present and future generations.

In implementing these UN strategies, the programme draws on a multi-disciplinary approach in resolving health issues which avoids hazardous sectorial approaches of the past.

The Task Force assists in providing advice in the reform of national policies and legislation which in the past have hampered remedial action in the protection of human and environmental health. These include *inter alia* poverty, under-nutrition, and anaemia which affect 5 to 15 per cent of all adult men, with higher proportion among women and children in one fifth of the total world population. Of equal concern are the scourges of communicable diseases—typhoid, gastro-intestinal ailments, cerebrospinal meningitis, tuberculosis, pneumonia, etc.—which affect an estimated 500 million people.

The Task Force is thus closely concerned with finding alternative environmentally sound methods and techniques for the control of major agricultural pests and vectors of human diseases, especially in developing countries. The priorities are the control of malaria, schistosomiasis, zoonoses and food-borne diseases, as well as major agricultural pests in cotton. A further main concern is the question of chemicals which are banned in their countries of origin, but which are being dumped in the developing countries.

These concerns are strongly supported by programmes of training and education for scientists and technicians from the developing countries which are undertaken in close collaboration with FAO, WHO and national Governments.

At the same time, the Task Force is also involved in the environmental health problems of the developed countries. These include chronic social diseases of environmental concern—cardiovascular diseases and carcinogens, stress, trauma and health hazards accruing from affluent diet and life-styles. Again, there is close liaison in these areas with other UN bodies, WHO in particular.

Another activity related to a joint UNEP/WHO project is the publication of what are described as Environmental Health Criteria Documents. To date, 16 of these criteria documents are in circulation, covering a number of potentially dangerous pollutants such as mercury, asbestos, cadmium, mycotoxin, DDT and its derivatives, carbon disulphide, carbon monoxide, tin and organotin compounds, sulphur oxide and suspended particulate matter, oxides of nitrogen, polchlorinated biphenyls and terphenyls, ultraviolet radiation, microwaves and noise.

Each report assesses the dose/effect relationships, recommending health-based limits both in occupational and normal exposure to these pollutants in the environment.

Within UNEP, there is a close relationship between the Task Force and the International Register for Potentially Toxic Chemicals (IRPTC) and the Global Environmental Monitoring System (GEMS) in matters concerning monitoring, surveillance and assessment of the impact of pollutants like pesticides, fertilizers and drugs on man and his environment and dissemination of accrued data to Governments. The newly establihed ILO/WHO/UNEP/International Chemical Safety Programme is geared to enhance the evaluation of some selected chemical pollutants.

**Specific activities**

- Continued editing of the WHO/UNEP Environmental Health Criteria Documents: in preparation are documents on hydrogen sulphide, and polycyclic aromatic hydrocarbons;
- on-going contributions to the WHO *Evaluation of Toxicity of Environmental Chemicals;*

# Human and Environmental Health

- an evaluation of UNEP-assisted Food and Animal Feed Contamination projects;
- co-operation in the work of the FAO/WHO Codex Alimentarius Commission to assist developing countries in applying health control in respect to foodstuffs;
- development of the joint FAO/WHO/IARC/UNEP project on fungal contamination of food human health in Swaziland;
- joint review with WHO of first draft guidelines on the health aspects of exposure to non-ionizing radiation;
- participation as a joint WHO/UNEP African Regional Workshop on Lay Reporting System on Health Information (Nairobi, September);
- organization with WHO of a seminar on water hygiene (USSR, September);
- assistance to ECE in incorporating environmental dimensions into its activities in Europe on the studies of the long-range transmission of air pollutants on the health of man and the environment;
- production of UNEP draft guidelines on toxic wastes management and disposal for WHO (EURO) and Harwell Laboratories, UK.

**Meetings**

- WHO Expert Consultation on Inter-Sectorial Co-ordination of Food Contaminants Programme (Lisbon, November);
- *A joint IAEMS/IARC/UNEP workshop on Mutagenecity and Carcinogenicity Testing (University of Nairobi);*
- A joint UNEP/WHO Expert Committee on the Biological Control *of Vectors (Geneva, December);*
- UNEP/WHO Expert Meeting on Monograph on Epidemiological Methods for Environmental Health Studies (Geneva, scheduled for January 1982).

**PEST MANAGEMENT**

UNEP supported and participated in a joint project with IAEA and FAO for an International Symposium on Nuclear Techniques in the Study and Control of Parasitic Diseases of Man and Animals. Two papers were presented by UNEP:

# Human and Environmental Health

"Changing Patterns of Parasitic Diseases Because of Environmental *Changes" and "Environmentally Sound Integrated* Methods for Controlling Parasitic Diseases".

In addition, UNEP participated with HO and FAO in a panel of experts on vironmental Management for seases and Vector Control in Geneva, ptember. The panel made several commendations on administration rangements for strengthening of the int secretariat and for further support r on-going health and water resources ojects.

A joint UNEP/PAHO project ntinues on Seroepidemiology of uman Hydatidosis and the diagnosis of e disease in school children.

**her specific activities**

A fifth UNEP/ICIPE group graining course on *Components Essential for Ecologically Sound Pest Management Systems* (Nairobi, July-August);
a second UNEP/USSR *International Training Course on Ecologically Safe Methods for Control of Malaria and Its Vectors* (Moscow, Kransnodar, Tbilisi and Baku, August-September);
a second UNEP/USSR training course on *Zoonoses Management*.

**ROJECTS — 1981**

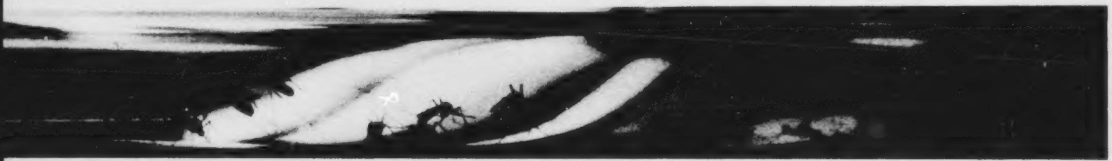
**Cost to UNEP (US dollars)**

| | |
|---|---|
| Guidelines for transboundary ansport and disposal of hazardous hemical wastes | 43,424.88 |
| Evaluation of toxicity of vironmental chemicals | 21,524,00* |
| Development and integration of vironmental and occupational health ogramme in Egypt | 43,585.00 |
| • Strengthening the work of the *FAO/WHO Codex Alimentarius* Commission and FAO/WHO capabilities to assist developing countries in food control (Phase II) | 87,195.21* |
| • International training for control of environmental contaminants in food | 8,473.82 |
| • Environmental health criteria (Phase II) | 33,172.00 |
| • Health aspects of exposure to non-ionizing radiation | 3,373.00* |
| • Fungal contamination of food and human health (aflatoxins) | 17,763.61 |
| • Manual of analysis of environmental carcinogens: selected methods | 9,244.12 |
| • Training courses on food contamination with special reference to mycotoxins | 71,109.50 |
| • Executive summaries of environmental health criteria | 1,000.00 |
| • Workshops on food and nutrition planning, programming, implementation and evaluation | 20,680.00 |
| • Investigation and control of marine pollution in Cuba | 2,268.12 |
| • Prevention of health risks through surveillance of drinking water quality | 878.00 |
| • Impact of long-range transmission of air pollution on health of man and environment (Europe) | 100,000.00* |
| • Monograph of epidemiological methods for environmental health studies | 100,000.00* |
| • Environmental health criteria (Phase II) | 28,000.00 |
| • WHO/UNEP Lay Reporting on Environmental Health | 7,129.14 |

* Commitments

**Pest management systems**

| | |
|---|---|
| • Development of Ecological Elements in Pest Management Systems for Species of Importance in Agriculture and Human Health | 170,460.74 |
| • The FAO/UNEP Near-East Inter-country Programme for the Development of Integrated Pest Control in Cotton Growing | 112,842.87 |
| • The FAO/UNEP African Inter-country Programme for the Development of Integrated Pest Control in Cotton Growing | 3,834.00 |
| • The FAO/UNEP Co-operative Global Programme for the Development and Application of Integrated Pest Control in Agriculture | 16,493.39 |
| • The UNEP/WHO Project on the Seroepidemiology of Human Hydatidosis | 31,920.16 |
| • The UNEP/WHO Expert Meetings on Cysticercosis/Taeniasis and Echinococcosis/Hydatidosis | 3,361.00 |
| • The UNEP/USSR International Training Courses on Ecologically Sound Methods for Control of Malaria and Its Vectors | 76,456.26 |
| • The UNEP/USSR Training Courses on Ecologically Sound Methods for Control of Malaria and Its Vectors | 45,602.43 |
| • The FAO/UNEP Latin American Inter-country Programme for the Development of Integrated Pest Control in Agriculture | 16,180.59 |
| • Support to the International Symposium on Nuclear Techniques in Control of Parasitic Diseases in Man and Animals | 33,262.88 |
| • FAO/UNEP/WHO Panel of Experts on Environmental Control of Vectors | 10,000.00 |



# Desertification

EFFORTS directed at the control of desertification at national and international levels continued to increase at a steady but slow pace during 1981. The extent of these efforts and achievements was marginal in comparision to the magnitude of the problem at the regional and global levels. Lack of funds remained the principal among several constraints to the launch of an effective desertification control scheme.

The present system of international financing of desertification control activities is based on fluctuating voluntary contributions on which there are many competing demands. There is a need, therefore, for new supplementary means of financing. In this regard a second *Study on Financing the United Nations Plan of Action to Combat Desertification*, developed in 1981 by a group of high-level consultants assisted by the UNEP secretariat, was submitted by the Secretary General to the thirty-sixth session of the General Assembly.

The first section of the study contains feasibility studies and concrete recommendations calling attention to the possibility of obtaining resources for development purposes, including desertification, notably through international taxation of trade flows, yields from IMF gold sales, and proceeds from a proposed indirect link between SDR allocations and development finance.

The second section sets out detailed modalities of obtaining resources on a concessionary basis. The third section of the study contains a detailed work plan for the establishment of an independent financial corporation for the financing of desertification projects, including a structure and organization.

UNEP's Desertification Branch increased its efforts during the year to co-ordinate international, regional and national activities and co-operative efforts in the implementation of the Plan of Action to Combat Desertification. It also continued to provide secretarial services to the Inter-Agency Working Group on Desertification (IAWGD) and to the Consultative Group for Desertification Control.

The IAWGD held its fourth and fifth meetings in April and September 1981 respectively. The fourth meeting discussed ways and means of implementing General Assembly resolution 35/73 para. 10, calling on UNEP *in its co-ordinating and catalysing role, to institute, in co-operation with organs, organizations and bodies of the United Nations system, specific programmes of research and training at the national, regional and international levels, and agreed on the first steps to be undertaken.*

The meeting also discussed and approved in general the section Arid and Semi-Arid lands ecosystems including desertification of the Medium-Term Plan (1981-1983).

The fifth meeting reveiwed progress made in the implementation of General Assembly resolution 35/73 para. 10 since the fourth meeting and made recommendations on the follow-up action. Also reviewed was a draft programme and a work plan for preparation of a first general assessment of the progress made in the implementations of the Plan of Action to Combat Desertification to be undertaken in 1984. The second draft of the *Compendium of Projects and Programmes of the United Nations System in the Field of Desertification* was presented to the meeting. Comments and views of the members of the IAWGD were included in the final text of the Compendium.

- The Consultative Group for Desertification Control (DESCON) comprising national Governments, international organizations and financial institutions, held its third session (DESCON-3) in August 1981 and considered 12 anti-desertification project proposals presented by 11 developing countries from Africa, Asia and Latin America and one by FAO. Ten of these proposals

# Desertification

received expression of interest in support by donors. The group also discussed ways and means of improving its work and made recommendations.

- The Special Account for Financing the Plan of Action received expressions of general support from 34 Governments. However, despite the continuous efforts of both the General Assembly and the Governing Council of UNEP, the funds currently held in the Special Account amount only to US$25,000, paid by Chile ($10,000), Mexico ($5,000) and the Sudan ($10,000). Contributions of Brazil as well as Bangladesh, which offered to contribute in its own currency, remain unspecified.

**Specific activities in 1981**

- Assistance to two developing countries in formulating desertification control projects; pre-DESCON missions to a number of countries and financial institutions to discuss project proposals submitted to DESCON-3;
- consultations with. and support to, UNSO which is providing assistance to 19 African countries in implementing the Plan of Action to Combat Desertification on behalf of UNEP;
- follow-up on projects with transnational implications including the *North African Green Belt* (five projects), the *Major Aquifer in North East Africa* (two projects); and the *Desertification Monitoring Programme in South America* (three projects);
- support to MAB-3/IPAL *(Man and the Biosphere Programme of UNESCO Project 3: Integrated Project on Arid Lands)*, Section Tunisia (Phase II);
- implementation of actvities within the framework of the UNEP/USSR project on *Combating Desertification though Integrated Development;*
- three international desertification training courses, *Rangeland Ecology and Pasture Productivity, Reclamation of Saline Irrigated Soils*, and *Sand Dune Fixation*, organized jointly by UNEP and the Government of USSR within the framework of a UNEP/USSR project *Desertification Control Training Courses* with the participation of 56 specialists from more than 20 developing countries;
- a Desertification Control Training Seminar for Developing Countries, supported by the Environment Protection Office in China, in

association with the Institute of Desert, Lanchow, China with the participation of 18 post-graduates from developing countries;

- participation in the activities of the UNEP/FAO/UNESCO/WMO/ISSS project on desertification assessment and mapping;
- co-sponsorship with UNDP of an Inter-Agency Meeting on Desertification and Protection of the Environment in Africa, to discuss proposals for UNDP Regional Programme for Africa (1982-1986) and measures to be taken in respect of the UNDP Governing Council decision concerning the establishment of a Special Programme for providing increased assistance to drought-stricken African countries;
- Consultations with and assistance to UN Regional Economic Commissions (ECA, ECWA and ESCAP) for the organization of post-UNCOD (UN Conference on Desertification) regional meetings, technical workshops and seminars.

**PROJECTS — 1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| • Combating Desertification Through Integrated Development | 62,810.16 |
| • Desertification Assessment and Mapping | 58,833.91 |
| • Green Belt Around the City of Niamey | 55,290.00* |
| • Extension and Creating Awareness in Respect of Desertification Control: Bir Lahmar Perimetre | 30,000.00* |
| • Transnational Project on the Major Regional Aquifer in North East Africa | 30,000.00* |
| • Desert Control Training Seminar for Developing Countries at the Institute of Desert, Lanchow | 2,650.00 |

*Commitments

# Soils and Water

## SOIL

THE Task Force in the soils area is concerned with UN agencies and other relevant international organizations and research bodies in the preparation of the elements of a World Soils Policy and Plan of Action for its implementation, related to the New International Development Strategy (NIDS) and the World Conservation Strategy (WCS). *The Task Force is closely co-ordinated its activity with UNEP's Plan of Action to combat desertification.*

During 1981, a second High Level Expert Group meeting was held for the discussion of the draft documents *Elements of a World Soils Policy* and *Guidelines for the formulation of national policies.* The meeting produced a document entitled *A proposed World Soils Policy and Framework of Plan of Action for its Implementation.* The policies document will be published jointly with FAO and will be distributed to Governments together with the recommendations of the Expert Group meeting.

Preparations have now begun for another Expert Group meeting in early 1982 for the finalization of a World Soils Policy Plan of Action.

### Other activities in 1981

The Task Force prepared a draft of *Guidelines to Control Soil Degradation and Land Rehabilitation After Mining Activities*, which was UNEP's goal for 1982 in the field of soils.

In co-operation with FAO, UNESCO and ISSS, the Task Force is also engaged in the development of an *International Referential Base for Soil Classification.* A second meeting, sponsored by UNEP, was held in June 1981.

A draft document also was prepared on the *Criteria for Global Land and Soil Monitoring System*, as a part of GEMS.

The second phase of the project *Save Our Soils*, for the identification of socio-economic constraints to the adoption of sound soil conservation policies in the arid, semi-arid and tropical zones, was signed.

### New projects

A number of new projects were put forward for discussion; these include:

- erosive effects of rainstorms on land and soils in the humid tropics and system of conservation measures *(phase 1)*;
- *impact of integrated land/soil*

- and resources for the population of the future: integrated management for arresting land degradation *(phase 1)*;

- process of land and soil transformation: criteria for monitoring and evaluation;

- referential soil profiles collection based on the Soil Map of the World in International Soil Museum, Netherlands;
- training course on environmental control and management in arid and semi-arid zones of irrigated agriculture.

## WATER

UNEP this year became a member of the Steering Committee for Co-operative Action to the International Drinking Water Supply and Sanitation Decade (IDWSSD).

At the global level, this group co-ordinates activities specifically related to the IDWSSD and is formed by representatives of the UN, UNDP, WHO, the World Bank, UNICEF, FAO, ILO, UNESCO, HABITAT and UNEP. A principal output of the committee was to set out a joint policy for co-operative action, giving emphasis to the establishment of national programmes and projects with international support.

At the country level, UNDP Resident Representatives have been assigned the role of fostering co-ordination and facilitating a collaboration between national agencies, the UN system and ODAs. Baseline conditions in the countries have been established and a system for monitoring progress put into effect by the committee.

At the national level, UNEP forms part of the Technical Support Team for Kenya and, as such, participated in a WHO/SIDA workshop *(29-31 July, 1981 at Namanga)* which formulated a background paper to guide the preparation of a National Decade Plan for Kenya.

The development and co-ordination of the environmental components of water resources programmes are assigned to UNEP with the assistance of the Intersecretariat Group for Water Resources (IGWR) whose overall responsibility is to ensure adequate co-ordination of all activities in the field of water resources.

The terms of reference adopted for the Group include:

- Co-operation in the monitoring of the progress being made in the implementation by Governments of the Mar del Plata Action Plan;
- promotion of co-operative and joint planning of the water-related programmes of the UN system and review of their implementation;
- assistance in co-ordinating the water-related activities of the UN system at country and regional levels.

- one of the most important contributions of UNEP to the group is the development of the water component of a System-Wide Medium-Term Environmental Plan (SWMTEP) for 1984-1989, the realization of which will be an essential contribution towards the application of environmentally sound management techniques in the water field. UNEP has finalized the preparation of a first draft of the plan to be submitted for adoption to the tenth session of UNEP's Governing Council.

Within its water programme, attention was also given to the achievement of Goal achievement of Goal 9—*Implementation of demonstration projects for rational management of water resources.* The following projects have been established, but more time is still required before their results can be evaluated:

- *In Swaziland, an Integrated Water Supply and Demonstration project in co-operation with UNICEF.* The project has been extended until the middle of 1982 and the evaluation of the project, particularly its demonstration effect, is scheduled for early 1982.
- *In the Mekong Delta, a project on the Environmental Aspects of Water Development, Phase I.* This phase was basically investigative and the demonstration phase II is scheduled for the period 1982-1985.

# Soils and Water

- *In the Sudan, an integrated irrigation demonstration project.* Problems developed as a result of the inherent characteristics of the design and operation of a 2.6 million-acre irrigation system in Gezira Province. These included problems of spreading weeds, lack of adequate water supply and sanitation facilities, and expanding mosquito and snails habitats. However, following implementation of the the project, the settlers in this scheme will have reliable water supply and safe waste disposal facilities. Provision is also made for on-the-job training in water supply, sanitation, and irrigation management to reduce health hazards. The project will be used as a case study for demonstrating the integrated irrigation approach, to policy-makers, planners and managers.

### Specific activities in 1981

In addition to the activities outlined, the following work was undertaken:

- In co-operation with WMO, the project "Water Quality and Environmental Impact of the Upper Nile" was completed in December 1981. The output of the project was the development of a hydrological model and training of participants from the riparian countries of the project on the operation of the model. The main objectives of the model are:
  - to provide information on the water quality of the lakes of the Upper Nile if, due to further development of water resources, the quantity and quality of water are changed;
  - to provide information on environmental impacts and water changes if, due to water resources developments, the present system is changed—including eutrophication, ecological balance, disease vector agents, weed infestation and effects on fisheries;
  - to provide information on how a suitable water quality could be achieved or maintained to meet present and future requirements.

  The model has been developed to achieve those objectives and will provide the required information to decision-makers on policy measures for water management. It could also be used to set up similar programmes of data collection and analysis on other lakes of Equatorial Africa, provided further refinement is achieved as a result of additional data collection.
- UNEP has continued its support to the International Training Centre on Water Resources Management (CEFIGRE) in France. The French Government and UNEP are co-founders of the Centre. In 1981, 50 participants attended two training sessions in French *(1-20 October)* and English *(12 November—10 December)*. The Programme with CEFIGRE was reviewed and an agreement reached on the orientation of the next phase which aims at implementing seminars on norms and guidelines for waste treatment and pollution control, drilling techniques and appropriate technology, training courses on rural water supply, water resources planning in arid zones and irrigation and support to a research group on models of water table.
- Under the UNESCO/UNEP project "Protection of the Lithosphere as a Component of the Environment", implemented in co-operation with UNEPCOM and the USSR Academy of Sciences, two international training courses have been held on *Protection of Ground Water against Pollution and Depletion* and

*Monitoring of Exogenous Geological Processes and Protection of the Lithosphere against Negative Impacts of Mudflows and Landslides.* Two monographs are under preparation, following recommendation made by the International Scientific Council, entitled *Hydrogeological Bases of Ground Water Protection* and *Prediction of Mudflows and Landslides and Protection against Them.* It is expected that these monographs will be of very great assistance to policy-makers, planners, engineers and technicians from developed and developing countries.

# Soils and Water

**Other activities included:**

- A study tour in the USSR on environmentally sound management and utilization of river basins;
- a consultant's mission to the Mekong Committee and subsequent preparation of a draft project document (Phase II);
- continued implementation of a project on *Ecosystems dynamics, freshwater wetlands and shallow water bodies* whose aim is the improvement of knowledge, publication and dissemination of information and guidelines.
- UNEP further sponsored participation of representatives from developing countries at the International Symposium on Water Resources Management in Industrial Areas. It has also participated in the Inter-regional Meeting of International River Basin Organization; Scientific Council Consultative Meeting of Lithosphere Problems; the UNESCO/WMO International Conference on Hydrology and the Scientific Bases for the Rational Management of Water Resources; the Eighth Session of the Steering Committee for Co-operative Action for the IDWSSD; and meetings of the ACC Intersecretariat Group for Water Resources.

**PROJECTS — 1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| Control of Water Logging and Salinity in the Areas West of the Nubaria Canal, Egypt | 2,085.00 |
| World Assessment of Soil Degradation (Phase I) | 29,709.09* |
| Symposium on Environmental Problems Resulting from Coal Industry Activities (Katowice, Poland) | 49,152.57 |
| Desertification Control Training Courses | 357,873.96 |
| Studies on the Impact of Agricultural Management on the Environment | 38,200.00* |
| Expert Meeting on World Soil Policy and Plan of Action for Its Implementation, February 1981, Rome | 69,556.89 |
| Support of the 12th International Congress of Soil Science | 20,112.99 |
| Save Our Soils (SOS) Phase II. Case studies of the Operation of the Constraints Using the Methodology Developed in Phase I | 115,000.00* |
| Impact of Integrated Land/Soil Management of Mountain Agro-Ecosystem | 7,00.00* |
| Support to the International Training Centre for Water Resources Management (CEFIGRE) in Valbonne, France (Phase I) | 80,513.44 |
| Water Quality and Environmental Impact Model of the Upper Nile Basin | 18,494.00 |
| Integrated Water Supply: Demonstration Project in Swaziland | 30,197.28 |
| Training Courses for Environmentally-Sound Management and Utilization of River Basins | 17,289.41 |
| Protection of the Lithosphere as a Component of the Environment | 345,961.00* |
| Environmental Aspects of Water Development in the Mekong Delta, Phase I | 30,789.34 |
| Integrated Irrigation: Demonstration in Sudan | 35,000.00 |
| Ecosystem Dynamics in Freshwater Wetlands and Shallow Water Bodies | 2,233.24 |

* Commitments

# Conservation

UNEP's concern in this area divides into conservation of "wild living resources" (terrestrial wildlife, marine wildlife and protected areas) and of genetic resources. There are differences in both scientific and management approaches and for this reason they are dealt with separately in this report.

## WILD LIVING RESOURCES

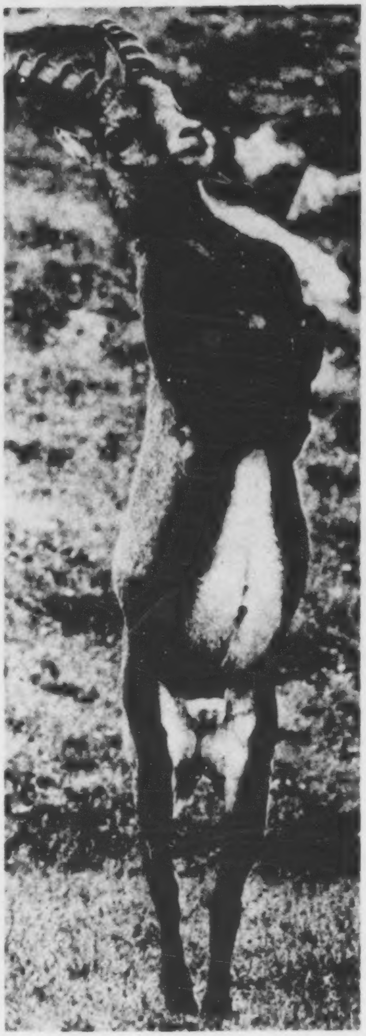
*Terrestrial Wildlife and Protected Areas*
ECOSYSTEMS and ecological processes with which wild animals and plants are associated have obvious benefits to man in economic, scientific, educational, recreational and cultural terms. However, there is cause for concern over the erosion or destruction of natural habitats, disruption of natural laws and balances, over-exploitation of species, and dissipation of renewable resources.

The basis of UNEP's work in this area is therefore the need for more effective measures for the restoration, protection, sound management and use of wild living resources and their habitat.

The overall objective is to reverse the trend towards loss of species diversity and irreversible changes in the ecological balance and the environment.

### Specific activities in 1981

(i) The World Conservation Strategy
UNEP maintained contact with Governments and other organizations concerned with implementation of the strategy and contributed to an international exchange of information. There was close collaboration in particular with the Ecosystems Conservation Group (ECG); technical committees of the FAO on fisheries, tropical forests, etc; the Man and Biosphere (MAB) Council; and the IUCN which reviewed the year's activities by Governments at its fifteenth General Assembly at Christchurch, New Zealand, in October.



(ii) The World Charter for Nature
Following a resolution of the General Assembly *(35/7, October 1980)*, a meeting of an *ad hoc* expert group was convened by UNEP (at Nairobi in August) to review 50 responses from Governments on a draft of the charter. The group's report was then transmitted to the UN Secretary-General.

Governments which have not contributed their views on the draft have been invited to do so before a revised draft is put before the General Assembly at its thirty-seventh session for consideration and adoption.

*Conservation Monitoring Centre (CMC)*
The centre was established at Cambridge, UK, by the IUCN with financial and other support from UNEP and the World Wildlife Fund (WWF). Its purpose is to develop a computer data base *inter alia* for the issue of a new generation of "Red Data" books and sheets on the status of wildlife species. The data will include an indication of the degree of threat to a particular species, or taxon, details of its population and distribution, estimated and projected, and a list of the most important references and conservation measures proposed.

The proposals are primarily concerned with the protection of the animals and plants and their habitats, and the elimination of threats to their survival, and/or the collection of ecological data on which to base more specific and effective remedial measures.

(iii) Publications
The following publications were issued under the UNEP/IUCN projects:

- *IUCN Mammal Red Data Book Part I*, covering 155 threatened mammalian taxa of the Americas and the Australasian zoogeographic region (excluding Cetacea);
- two booklets comprising sample data sheets of amphibians and reptiles and invertebrates to illustrate the approach to be taken in the forthcoming revised and enlarged *Red Data Book for Amphibians and Reptiles* and the first volume of the *Invertebrate Red Data Book*; a booklet on *Threatened Freshwater Fish and Sri Lanka;*
- the ICBP Bird Red Data Book, *Endangered Birds of the World*, covering 437 taxa, (reprint of *Volume II, Aves* in hand book form)
- a first draft of the *Botanic Gardens List of Macronesian Threatened Species* covering 473 taxa in Macronesia so far identified of

# Conservation

which 394 are being cultivated in 42 gardens. This list is meant to be of special use to managers and curators of botanic gardens in planning and building the collections, and will help remove pressure on wild collections.

Other documents published under the same projects were: *Annotated Lists on Threatened Mammals, Amphibians and Reptiles and Plants of EEC; Red Data Book Monographs on Two Plant Groups and Revised Regional Plant Lists for Europe, North Africa and Middle East; Regional Plant Lists for the Caribbean, Tropical Africa, Central America; new world-wide plant lists for Cycads, Tree ferns, Palms and Cacti.*

(iv) Action Plans

Progress was made on action plans for the conservation of species as follows: *On primates*, an up-dated version of the plan was started; on the *African rhino*, a draft action plan was completed; on *pigs, peccaries and the Asian antelope*, work started on first draft plans; and on *marine turtles*, a first draft plan was completed.

(v) CITES

States membership of this Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) stands at 75 as of end of November 1981. The revised appendices of the Convention now include 477 mammals, 911 birds, 342 reptiles, 16 amphibians, 24 fish, 45 molluscs, 38 insects and several hundreds plant species.

The third meeting of the Parties to the CITES Convention *(New Delhi, 25 February - 8 March)* was attended by 66 Governments and more than 80 national and international organizations. The meeting decided on a world-wide trade ban on whales and their products; new trade controls for more than 300 species of parrots; and a number of measures to improve national enforcement of the Convention. The Conference also confirmed financial arrangements for the biennium 1982-1983 under which member states will contribute to a special UNEP Trust Fund for the Convention, while direct UNEP Fund contributions will be phased out entirely.

During the period under review, the CITES Secretariat brought more than 120 cases of suspected violations of the convention to the attention of the authorities in the countries concerned.

Progress under two joint UNEP-CITES projects on the preparation of a *Checklist of the Vertebrates of the World* and an *Identification Manual for Endangered Species* includes the preparation of a book on *Mammal Species of the World* envisaged for publication in early 1982. Also in preparation are sample data sheets for a chapter on *Testudinidae* (Vol. 3) in the Identification Manual. Data for chapters in the manual on snake skins, owls, marsupials, and fur trade nomenclature have been completed and are ready for printing; and data for chapters on otters, felidae skins, and lemuridae are in the process of completion.

Also in support of the CITES Convention, the Nature Conservancy Council of the United Kingdom, published a *World Checklist of Endangered Amphibians and Reptiles* in 1981 to help to clarify conditions on the issue of permits to trade in amphibians and reptiles.

(vi) Policy Statement

An Ecosystem Conservation Group/WHO policy statement on the *Use of Nonhuman Primates for Biomedical Purposes* was approved by the WHO Informal Consultation on the International Primate Resources Programme (Geneva, 9-12 November 1981).

(vii) UNEP/IUCN

Under two joint UNEP/IUCN projects, a revised *Classification of the Biogeographic Provinces of the World* including a province-by-province presentation, a world map at a scale of approximately 1:25,000,000 was prepared.

Through questionnaires, 130 new and revised inventory sheets were prepared for the *World Directory for the Afro-tropical Realm* and 88 new areas were added to the list of protected areas and are included in the proceedings (published in March 1981) of the meeting of the IUCN Commission on National Parks and Protected Areas (*Garoua, United Republic of Cameroon, 17-23 November 1980).*

A similar review of the planning and management of national parks and protected areas continued for the *Neotropical Realm*, and 350 revised inventory sheets were prepared for the World Directory and are included in the Proceedings *Conserving the Natural Heritage of Latin America and the Caribbean: The Planning and Management of Protected Areas in the Neotropical Realm* of the Working Session of IUCN's Commission on National Parks and Protected Areas (Lima, Peru, 21-28 June 1981).

A draft document on *Protected Areas of the Australian Realm* covering 354 revised inventory sheets was prepared in October 1981.

The 1981 United Nations *List of National Parks and Equivalent Reserves*, a comprehensive world-wide list of all parks and protected area of over 1,000 hectares was prepared in October 1981.

The following materials have also been published: *Parks* magazine (Vol. 6, Nos. 1 and 2) and *Nature Conservation in Northern and Western Europe and Guidelines for Protected Areas Legislation.*

# Conservation

### (viii) Great Gobi National Park

Progress on the UNEP project with the Government of Mongolia on the establishment of this Park includes the elaboration of a comprehensive training programme for future park managers and the preparation of a preliminary version of the Master Plan on the basis of ecological observations. A winter registration of main wild species in the park area was undertaken.

### (ix) Biosphere Reserves

As of October 1981, there were 209 biosphere reserves in 55 countries, covering an estimated area of 115 million hectares. Also, as of this date, 612 research projects have been reported for 82 biosphere reserves involving more than 2,000 scientists.

Although the network of designated biosphere reserves is continuously expanding, limited progress has been made towards implementation of the concept of biosphere reserves. To this end a UNEP/UNESCO project on the establishment of model biosphere reserves was recently launched to develop practical resource conservation programmes for sustained development in developing countries.

An informal meeting on the preparation of a Biosphere Reserve Congress, to be hosted by Byelorussian SSR in Minsk in 1983, was convened at UNESCO Headquarters on 26 September in conjunction with a MAB conference exhibit, "Ecology in Practice". The Congress to be convened by UNESCO under a joint UNEP/UNESCO project will emphasize ecosystem conservation and baseline research in the international network of biosphere reserves.

### (x) World Heritage

Under a joint project of UNEP and IUCN, advisory services were provided to UNESCO which is working on inventories of potential "World Heritage" sites and on requests for technical assistance. The World Heritage Committee in its September and October 1981 sessions approved 27 new listings of which 11 are natural. The World Heritage list now totals 112 sites of which 30 are natural.

### (xi) The Ramsar Convention

The number of Parties to the Convention on the Conservation of Wetlands of International Importance Especially as Waterfowl Habitat — the *Ramsar Convention* — was 30 as at the end of November 1981. They have together designated over 230 wetlands covering nearly seven million hectares for the "List of Wetlands of International Importance".

### (xii) EEC Task Force

The Report by the Task Force on the *Possible Promotion of a Network of Representative Ecological Areas* established by the Senior Advisers to ECE Governments on Environmental Problems was issued on 28 September 1981. The Task Force will ensure that the proposed network would be fully in line with the objectives of the World Conservation Strategy, as a policy for the conservation of living resources for a sustainable development.

### (xiii) UNEP Assistance

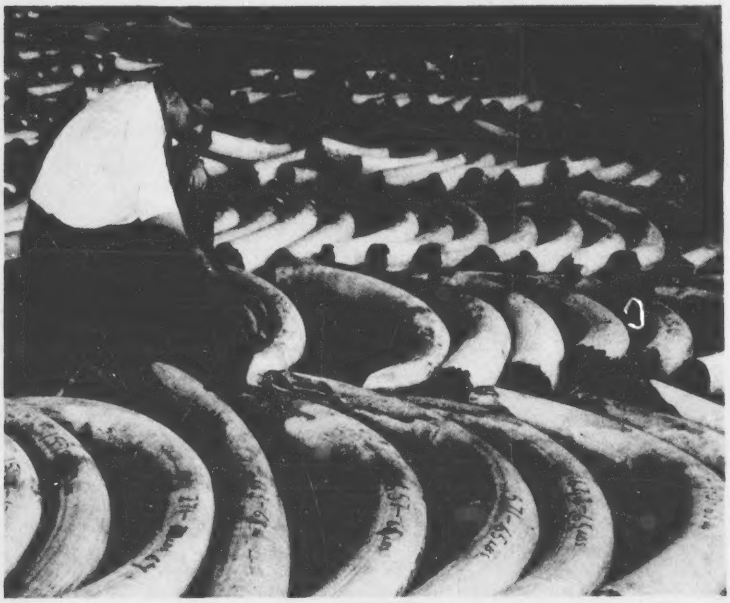
In 1981, UNEP supported Governments in living resources conservation for sustained development. Burundi was assisted in the preparation of the programme for the Institut National pour la Conservation de la Nature (INCN) and Fiji in the preparation of a framework for a national conservation strategy.

### (xiv) Tiger Paper

The *Tiger Paper* news bulletin, continued to be published quarterly, promoting the exchange of information relating to wildlife and national parks management for the Asia-Pacific region. *(FP/1104-75-02).*

### (xv) Directory

On the occasion of the first anniversary of the launching of the World Conservation Strategy, a Directory on Information Sources on Conservation was published by UNEP-INFOTERRA.



# Conservation

*Marine Wildlife and Protected Areas*

Marine living resources provide man with an abundant renewable supply of proteins and oils and constitute important dietary items for many people. In the most recent estimate, the harvest of fish from the oceans was approximately 65 million metric tonnes in one year. There is also growing interest in marine organisms as sources of biologically active organic compounds.

However, it is evident that measures for managing the living resources of the seas and their habitats are far from effective. Some of the major fish species have greatly declined over the past 10-15 years as have a number of marine mammals and turtles. The survival of certain species is threatened by over-exploitation and others have been reduced to the point at which economic exploitation is no longer possible.

Pollution, especially of the biologically productive coastal waters, is recognized as an increasingly serious problem, but an additional threat is the steady contraction of critical habitats and nursery areas, such as mangroves and coral reefs in the coastal zone. Incidental off-take of marine living organisms is also becoming a serious problem as fishing activities are intensified.

**Specific activities in 1981**

(i) Action Plan

UNEP contributed to the production of a draft Global Plan of Action for the Conservation of Marine Mammals. The document, prepared by FAO, contains proposals for action during the Medium-Term Plan period and outlines steps to be taken in the construction of a final Plan of Action. The draft was tabled at the 14th session of the Committee on Fisheries (COFI) at Rome in May which requested the FAO Secretariat to consult with UNEP and other relevant organizations on the further elaboration and implementation of the plan. Currently FAO and UNEP are considering the joint establishment of an *ad hoc* advisory committee of scientists and an *ad hoc* planning and co-ordinating committee.

(ii) Whales

The International Whaling Commission (IWC) held its 33rd annual meeting at Brighton, UK, in July. Proposals for a moratorium on commercial whaling again failed to attract the necessary three-quarters majority vote. Other proposals for stricter conservation also failed — one to protect the fin and sei whales; another to close commercial whaling in the North Atlantic; and a third to prohibit the taking of minke whales by pelagic factory ships.

However, zero catch limits were set for sperm whales in all areas except the Northwestern Pacific until scientists and the Commission meet early in 1982. The Commission also decided to prohibit, from 1983, the use of the non-explosive grenade to catch minke whales on grounds that it is inhumane.

A majority of the Scientific Committee had recommended an overall increase in the catch limit for minke whales in the Southern Hemisphere, though with reductions in the most intensely exploited areas. Because of the uncertainty in the scientific advice — which characterized much of the meeting — the catch limit was established between that of last year and the number favoured by the majority. Catch limits for other species and stocks were changed from the previous year, though not in accordance with clear scientific advice. A revision of the Commission's New Management Procedure, prepared during the past two years by its Scientific and Technical Committee was not adopted.

### (iii) Workshop

Preparatory activities continue for a UNEP-UNESCO (IOC) international scientific workshop on the conservation of coastal and inshore ecosystems and marine living resources of tropical Africa. The workshop, scheduled for 1982 is designed to complement various activities planned for the region, and in particular the developing UNEP Plans of Action covering the West, Central and East African regions. Among inputs will be a report of the technical discussions and recommendations of a workshop on East African Marine Coastal Resource Management at Mombasa, Kenya in October which was sponsored by the UN University.

### *Genetic Resources*

Through domestication, selection and breeding over many thousands of years, an immense genetic diversity has been created within the few animal and plant species which constitute the base of agriculture, animal production, and other bio-productive systems on which human survival depends. However, if the genetic base for any of these species is narrowed, their productivity and their value for exploitation will obviously reduce.

While genetic diversity increased in recent history, the trend has reversed in the last century and the genetic

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# Conservation

base for many of the major crop and livestock species has seriously narrowed. There are two main causes:

- Advances in breeding techniques created impressively productive strains, but at the same time displaced countless indigenous and "primitive" strains which have become extinct;
- further extinction was caused by the transformation and destruction of natural ecosystems which had the effect of depriving domesticated strains of essential genetic interaction with their wild relatives.

The newly developed strains are not as much high-yielding as high-responding to production inputs. They tend to perform poorly with low-input production systems characteristic of the small-scale and subsistence producer. Their genetic constitution is both narrow and uniform and thus they lack those genetic traits which impart resilience and adaptability to environmental challenges. The narrow genetic base also limits their usefulness as breeding material.

As a result, it is essential that there should be adequate reserves of indigenous, genetically diverse strains with which to continue the development of the animal and plant species on which mankind will depend in the immediate and more distant future. If these reserves did not exist, the implication is for a possible sudden collapse of production systems from which recovery would be doubtful.

Another important concern relates to micro-organisms which play a fundamental role in maintaining the integrity of bio-productive systems, in recycling elements in organic matter, eliminating pollutants, and controlling pests and pathogens. It is evident that the controlled use of these micro-organisms for the management of the environment and for development of waste-free technologies would be of great benefit to mankind.

However, because of their microscopic nature, their "domestication" by mankind lagged far behind plants and animals. Yet their inherent characteristics make them especially suited to a resource-limited world. Their immense genetic divesity and versatility play a significant role in maintaining soil fertility, in solar energy capture, storage and release; in the recycling of wastes; the detoxification of pollutants; the production of food, animal feed and chemicals; and in containing pests and pathogens.

The availability of specific microbial strains is thus essential if the potential use of micro-organisms in development of environmentally sound bio-productive systems is to be realized. These strains need to be properly documented and maintained in special "culture collections" or microbial "gene banks" from where they may be deployed together with the technology for their exploitation.

UNEP's concern is first to raise the level of awareness among national agricultural authorities and the farmers themselves of the hazards of genetic erosion. And, since the genetic base for a given species is often located outside the country or area of its exploitation, another objective is to maintain a stock of original, relic genetic material which is freely accessible to all nations.

In essence, UNEP aims to provide information on the genetic diversity of crop plants, trees, shrubs, animal, fish and microbial species which play a major role in environmentally sound development and environmental improvement; to preserve such diversity and to promote its appropriate deployment.

The overall strategy is to first undertake a systematic appraisal of all genetic resources of potential economic benefit to mankind and then to formulate ways of maintaining maximum genetic diversity within each of these species. To this end, a network of gene banks and genetic conservation areas has been established.

A distinction should be made between two essential and complementary requirements: conservation *imsitk*, i.e. through the maintenance of natural or man-made ecosystems in which genetic diversity occurs; and conservation *ex situ*, i.e. outside original habitats, either by preserving sample populations in genetic resources centres, zoos, botanical gardens, culture collections, etc., or in the form of gene pools of reproductive elements such as gamete storage for fish, germplasm banks for seeds pollen, semen, ova, cells, etc

In general, *in situ* conservation is favoured since it permits natural survival and evolution, although there are technical disadvantages in the resultant genetic diversification. *Ex situ* conservation is convenient and relatively inexpensive, but it could freeze natural evolution and interaction with the ecosystem or cause genetic degeneration, at least in some cases.

In general, the approach to genetic resource conservation obviously depends on the nature of the genetic matter considered: crop plants, forest trees and shrubs, farm animals, fish, micro-organism, wildlife, etc., and their present conservation status. For these reasons, a mix of various, flexible methods is being developed.

**Specific activities in 1981**

- Each of the five pilot microbiological resources centres (MIRCENS) consolidated its regional network and began to operate as the regional focal point for training, with over 200 scientists from developing countries receiving short-term training;
- a global registry of microbial genetic resources in Brisbane, Australia, extended its coverage with germplasm collections in 84 countries listed;

# Conservation

- an FAO/UNEP/IBPGR technical conference in Crop Genetic Resources was held in Rome; the meeting reviewed progress in international conservation and agreed on course of action for the next ten years. The recommendations were concentrated on conservation, characterization, evaluation, documentation and exchange of specified germplasm;
- the General Conference of FAO agreed that an internationl convention, including legal provisions for free accessibility of genetic resources of agricultural interest should be drafted and that the establishment of an international bank of plant genetic resources should be studied;
- a report on the FAO/UNEP Expert Consultation on *in situ* conservation of forest genetic resources, and a *Data Book on Endangered Forest Tree Species and Provenances* listing data sheets on 22 reportedly endangered provenances were published.

| **PROJECTS — 1981** | **Cost to UNEP (US dollars)** |
|---|---|
| • Promotion of the Establishment and Effective Management of Terrestrial and Freshwater Protection Areas | 77,857.98 |
| • Promoting the Conservation of Wild Fauna and Flora | 101,994.93 |
| • Monitoring the Status of Wild Fauna and Flora | 17,611.76 |
| • Secretariat of the Convention on International Trade in Endangered Species | 57,964.00 |
| • Checklist of the Vertebrates of the World | 10,000.00* |
| • Identification Manual for Endangered Species | 40,000.00* |
| • International Conference on Biosphere Reserves | 11,500.00* |
| • Promotion of Conservation Strategy in Selected Tropical Countries | 52,134.00 |
| • Establishment of Biosphere Reserves in Arid and Semi-arid Lands | 15,000.00 |
| • Regional Information Exchange in Wildlife and National Park Management for Asia and the Far East (Tiger Paper) | 5,003.46 |
| • Assistance to Mongolia in the Establishment of the Great Gobi National Park | 251,919.06 |
| • Development of an Integrated Programme in the Use and Preservation of Microbial Strains for Development in Environmental Management | 185,978.80 |
| • Conservation of Forest Genetic Resources | 18,000.00* |
| • Conservation of Crop Genetic Resources | 719.03 |
| • Development of a Co-ordinated International Programme on Biological Nitrogen Fixation | 4,800.00 |
| • Conservation of Animal Genetic Resources | 1,519.70 |

*Commitments

# Environmental Management and Development

THIS part of the UNEP programme is concerned with clarifying the concepts of integrating consideration of the environment in general economic development.

The objective is to ensure this consideration is taken into account in the formulation of development policies by individual nations and in international programmes of economic and technical assistance. Beyond that, the aim is to devise methods and procedures for the application of environmental protection measures in development planning and implementation.

## Specific activities in 1981

### (i) Least Development Countries

UNEP participated actively in the United Nations Conference on the *Least Developed Countries in Paris in September 1981*. A background paper and UNEP's policy statement at the conference outlined the nature and scope of the environmental problems of these countries and the role that the UN might play in the implementation of the *Substantial New Programme of Action for the 1980s* (SNPA) for the least developed countries. This programme as adopted by the Conference reflects environmental considerations adequately both in terms of individual sectors of development and overall national development policies.

### (ii) Cancun

UNEP contributed to the meeting on International Co-operation for Development at Cancun, Mexico, in respect of the environment aspects of this co-operation.

### (iii) Kenya Report

A Government of Kenya/UNEP/UNDP project on environment and development resulted in an extensive report delineating environmental problems in various sectors of development in Kenya. The possibility of relocating this project for other developing countries is being studied.

# Environmental Management and Development

### (iv) Background Report

A number of background papers and reports of regional seminars on alternative patterns of development and lifestyles were published during the year. A summary of the conclusions of the five regional seminars were published in the UNEP Executive Series of publications under the title *Choosing the Options.*

The conclusions and recommendations of a UNEP/ILO meeting of Workers' Organizations on the Environment were also published and widely disseminated among trade unions.

### (v) Latin America

Following a UNEP/ECLA regional seminar on alternative patterns of development and lifestyles, ECLA has been engaged in a programme of promoting co-operation among developing countries in Latin America in respect of "styles of development and environment" Under this activity, three regional seminars were held on environmental management of large dams, expansion of the agricultural frontier and the environment, and the process of urbanization and environment. These seminars identified the problems shared by countries in the region, facilitated exchange of experience in dealing with them and outlined the scope for regional co-operation in these areas.

### (vi) UN System

UNEP intensified its consultations with other UN organizations with a view to strengthening efforts of the system in respect of integration of environmental dimensions in programming of technical assistance at the country level. Four avenues of environmental programming of technical assistance were identified tentatively:

- assistance in the design and analysis of development projects and programmes with substantial environmental impact;

# Environmental Management and Development

- assistance in the formulation and monitoring of long-term and other periodic development plan;
- assistance in meeting major national environmental concerns, including those requiring regional or sub-regional co-operation; and
- assistance in the development of national environmental policies, machineries and legislation.

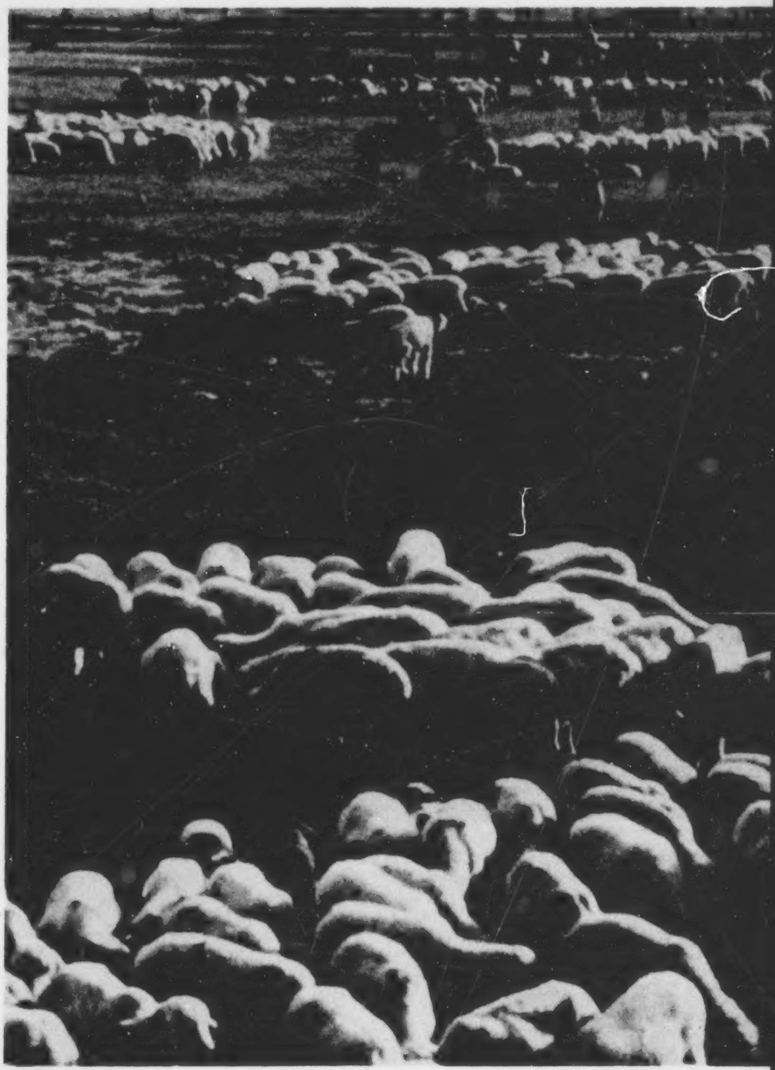
(vii) Project Reports

A number of reports were received related to on-going projects on "perceptions, attitudes and values of people in relation to environment and development", and "trade barriers and environment". Guidelines and information derived from these are scheduled for publication. UNEP also prepared a framework for research and the development of policy guidelines on the subject of the satisfaction of factions in relation to environmental quality. The research will be be carried out in co-operation with institutes in developing countries.

(viii) Cost-benefit Analysis

Three reports were published under the cost-benefit analysis programme. These were *The Economics of Survival, Analysing the Options,* and *Evaluating the Environment.* The first of these is an assessment of techniques for evaluating the economic and social consequences of environmental degradation. The other three constitute a summary of the proceedings of the first three intergovernmental expert group meetings convened by UNEP. They address the role of cost-benefit analysis in environmental decision-making.

Approved material for publication in 1982 in a volume entitled; *Guidelines to the Application of Cost-Benefit Analysis to Environmental Protection Measures.* The Guidelines will contain selected case studies to illustrate the use of new techniques to deal with assessment and evaluation problems.



(ix) Impact Assessment

A paper on "Impact Assessment—Basic Tool for Environmentally Sound Development" was prepared for the Meeting of Senior Advisors to ECE Governments on Environmental Problems for their meeting on 25-27 November 1981.

An expert group meeting on integrated physical planning was also held in Paris, where a group of experts considered the extent to which such planning techniques and procedures might be applicable in developing countries. A publication entitled *Guidelines to the Application of Physical Planning to Developing*

# Environmental Management and Development

*Countries* is being finalized.

### (x) Multilateral Development

The Committee of International Development Institutions on the Environment, which has been set up in pursuance of the Declaration of Principles for the incorporation of environmental considerations in development projects by nine multilateral development financing agencies and UNEP, met in its second session. The following were among the decisions of the meeting:

- The institutions were requested to designate focal points to facilitate contacts with the Secretariat at the working level;
- They would prepare written reports of progress in implementing the Declaration of Principles, and contribute to the development of a compendium of guidelines;
- In consultation with UNEP, the World Bank's Economic Development Institute will be requested to establish environment

# Environmental Management and Development

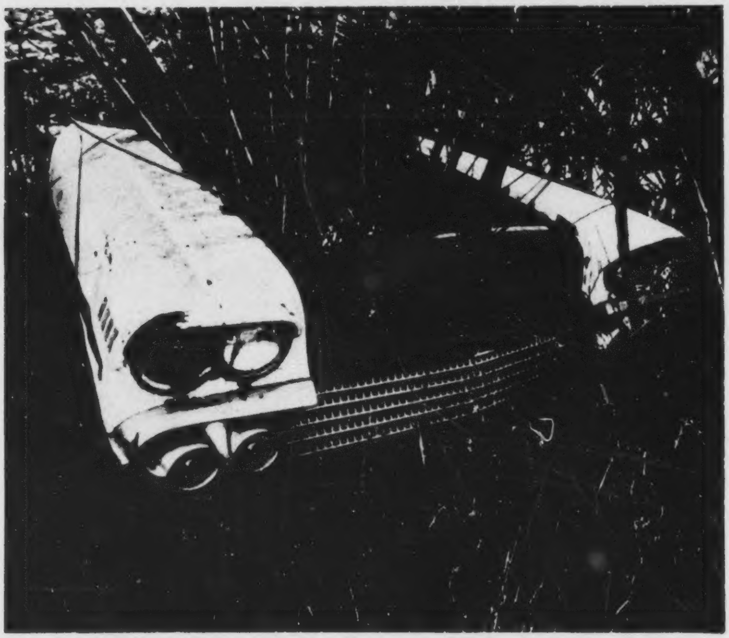
and development courses for the staff of Institutions with the necessary funding subject to negotiations between the EDI and members of the Committee;

- Finally, UNEP will establish a Secretariat which will provide adequate analytical support to the Committee.

**PROJECTS — 1981**

| | Cost to UNEP (US dollars) |
|---|---|
| • Methodology and Case Studies on Socio-Economic Evaluation of Natural Resources Conservation and Use in Planned Economics | 20,550.00* |
| • Ecological and Resilience Indicators for Management | |
| • A Programme of Conceptual and Methodological Studies in the Field of Environment and Development | 6,466.00* |
| • Pilot Eco-Development Project in Colombia: Sierra Nevada and Cienaga Grande de Santa Marta | 17,429.99 |
| • Study on Trade Barriers and Restrictions Resulting from Environmental Policies (Phase II) | 5,000.00 |
| • Seminar on Alternative Patterns of Development and Life Styles in Africa (Phase I) | 12,500.00 |
| • Seminar on Alternative Patterns of Development and Life Styles for the ECE Region—Preparatory Phase | 30,799.14 |
| • Studies and Backstopping Services for Ecodevelopment (Phase II) | 30,131.20 |
| • Inter-regional Seminar on Alternative Patterns of Development and Life Styles | 877.00 |
| • Horizontal Co-operation in Latin America Relating to Styles of Development and Environment | 102,577.10 |
| • Research into the Interrelationships Between People, Resources, Environment and Development (Preparatory Activity) | 23,185.68 |
| • Development of an Action Programme for Sound Environmental Management in the Wider Caribbean Area | 145,848.54 |
| • Environmental Implications of Salto Grande Multipurpose Hydraulic Development Scheme | 9,140.00 |
| • UNEP focal point in ILO | 43,443.00 |
| • Preparation of a Declaration of Principles and Operational Guidelines for the Inclusion of Environmental Guidelines for the Inclusion of Environmental Concerns in Activities Undertaken by Development Financing Agencies | 14,129.58 |
| • Development and Application of Appropriate Environmental Impact Assessment and Management Methodologies/Case Study for the Industrial Touristic Corridor Area Between Rio and Sao Paulo | 65,673.00 |
| • Research Programme to Study the Role of Perceptions, Attitudes and Values of People in Basic Human Needs in Relation to Environmental and Development Measures and Programmes | 8,119.90* |
| • Seminar on Technologies for Sustainable Satisfaction of Basic Human Needs | 12,000.00 |
| • Case Studies on the Relationship Between Basic Needs Satisfaction and the Environment | 3,000.00* |
| • Development of Cost Benefit Analysis Programme Phase I | 55,974.75 |
| • A Case Study of Environmental Management: Integrated Area Development in the Humid Tropics, the Selva Central of Peru | 68,700.00* |
| • Integrated Physical, Socio-economic and Environmental Planning—a Workshop | 18,166.87 |
| • Application of Environmental Management Techniques to Egyptian Industrialization: Phase I | 27,900.00* |
| • Methodology and Case Studies on Socio-economic Evaluation of Natural Resources Conservation and Use in Planned Economics | 23,550.00* |
| • Protect the Environment in Industrialized Countries | 2,193.00 |

*Commitments



# Environmentally sound and appropriate technologies

THE importance of environmentally sound and appropriate technologies (ESAT) cannot be over-emphasized. To take insufficient cognizance of the ecological and socio-economic appropriateness of technologies is to risk environmental degradation and to jeopardize development. Thus, every concern for society and for the environment in which it evolves must find expression in the choice of technologies.

Every area of the programme of UNEP also involves technology and has technological implications.

For instance, a substantial increase in food and agricultural production through the application of technology is a major objective; nevertheless, a plan to increase production must take into account the total environmental impact of the particular application on the agricultural base. On the other hand, we can see that the prolific advances of modern technology that characterize industrialization have led to spectacular increases in affluence, which have not necessarily resulted in an environment more conducive to the physical and mental well-being of man. Misguided industrial development has causod serious health hazards, accelerated the destruction of natural resources, and had harmful effects on life-sustaining ecological systems. The technological implications of energy conservation and utilization are extremely important. And finally, but not less important, a challenge to our scientific capability persists in the fight to protect human health. We have not yet laid to rest many of the ancient scourges while we are beset with new ones spawned by modern civilization.

On the basis of the above principles, UNEP activities on environmentally sound and appropriate technology include the following elements:

- projects oriented to develop, test and apply environmentally sound and appropriate technologies;
- dissemination of conceptual and practical experiences;
- training and education activities for the generation, adaptation and dissemination of technologies;
- incorporation of ESAT principles and concepts in other sectorial activities.

*The main activities during 1981 were the following:*

- *Management of Water Hyacinth* is an on-going activity initiated in 1979 jointly with the Commonwealth Science Council, based on a network of eight institutions of different countries which undertake specific sub-projects.
- *Training Seminar on Biogas in China (a UNEP/People's Republic of China project)* was held in August 1979, and the technical report and preparation of an audio-visual were begun during 1980. *Biogas Fertilizer System* (UNEP Reports and

# Environmentally sound and appropriate technologies

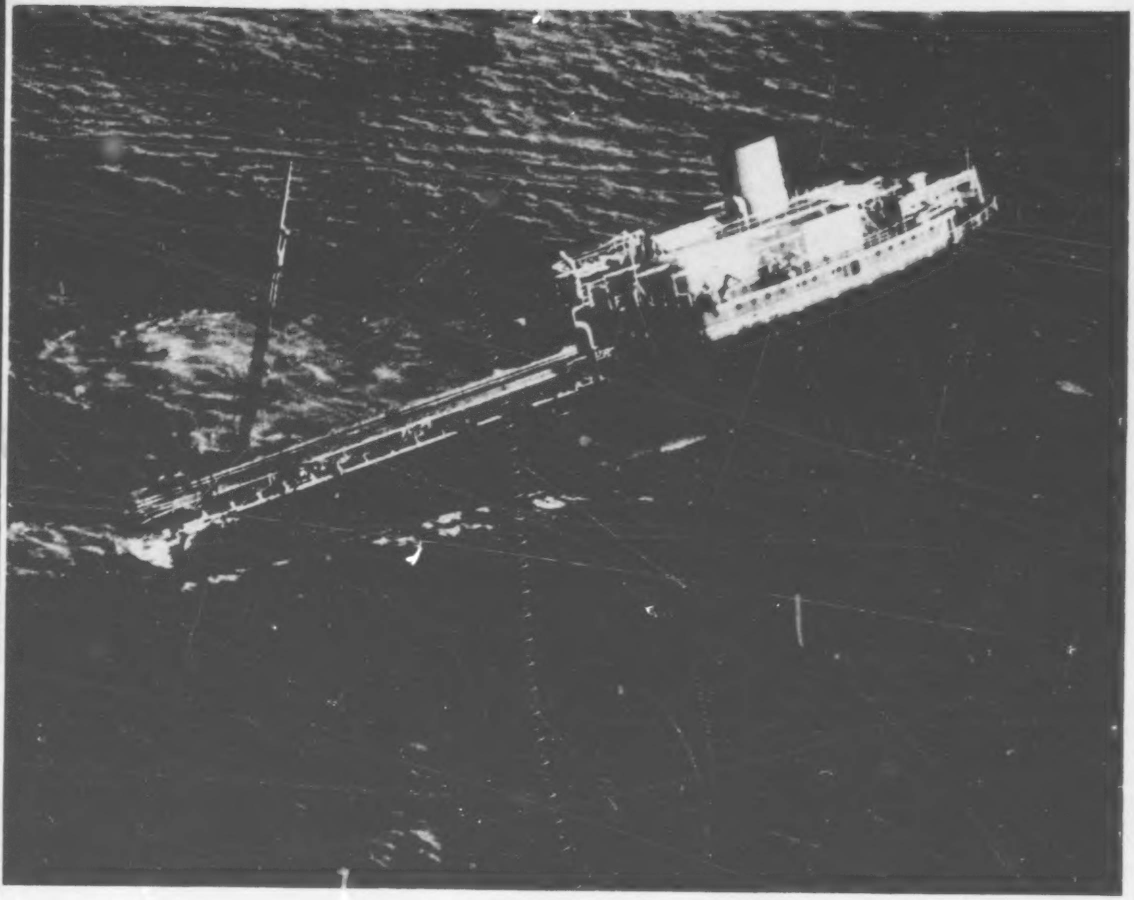
Proceedings Series, 2), a technical report on a training seminar in China, offers a good example of technology transfer among developing countries. Models similar to the one described in the report are currently being constructed in Bangladesh, Cyprus, Ecuador, Egypt, Guatemala, Guyana, Peru, Seychelles and Sri Lanka.

- The importance of the development of new non-waste or low-waste technology for rational utilization of natural resources and energy has been considered for the continuation of UNEP activities with ECE. Several monographs are being already prepared by the focal points of the European countries.
- Under the joint UNEP/ILO activity on appropriate technology for small-scale food production, the final manual on fish processing has been published; the manual on beef and pork processing has been completed and will be published during 1982. Two technical memoranda on meat processing and two on fruit and vegetables have also been prepared.
- The success achieved in the production of paper and board from water hyacinth fibres resulted in the construction of a pilot-cum-demonstration plant in Hyderabad, India, where invitation cards, conference folders and visiting cards are being produced. At this moment proposals are under consideration for the setting up of plants in Bangladesh, Sri Lanka and other interested countries.
- Utilization of water hyacinth in the production of biogas has also progressed. Anaerobic studies were conducted using dry powdered water hyacinth and seed developed in Jorhat, India. Work in this area has also been carried out at the Central Mechanical Engineering Institute in Durgapur, where there has been considerable advance in developing a fixed gas holder type of digester which might reduce investment costs.
- Also in India, at the Jawaharlal Nehru Technological University, work has been carried out on the design of a digester with a fixed dome.
- The utilization of water hyacinth for pollution control has been progressing in different places; specifically its use in the treatment of tannery effluents has been initiated at the Central Leather Research Institute in Madras, India, covering the following activities:
  - growing water hyacinth in compost and in other waste in an admixture with sewage;
  - analysing the plant simultaneously for the uptake of pollution;
  - utilizing treated waste waters for growing agricultural produce; and
  - analysing the vegetable produce for accumulated concentration of pollutants and their toxic effects, if any.
- The utilization of water hyacinth for the treatment of sugar refinery waste-water has been developed by the Standards and Industrial Research Institute of Malaysia. This institute has also been carrying out investigations with the co-operation of the Rubber Research Institute of Malaysia regarding the treatment of rubber processing effluents.
- A new activity was initiated in Hyderabad, India. This is the study of water hyacinth utilization for making water hyacinth cement boards. Water hyacinth fibre has certain similarities with asbestos fibre.
- A new development has been the utilization of water hyacinth for production and incorporation into integrated farming schemes. The concept is that by-product material from one aspect of farming is utilized in another acitivity in which water hyacinth can be used for biogas production, fertilizer production, animal feed and waste-water control.
- One of the important elements of the project is work relating to the biology of water hyacinth which is expected to be completed by September 1982. Associated with the study is the work of biological control. The possibility of integrating chemical and biological control has been recognized as an interesting aspect worth pursuing as an active component of the project.
- A workshop on biological control is expected to be held during the first week of 1982.
- An audio-visual presentation was prepared and the production of a film is being prepared, assigning the elaboration of a chart to each country involved in the project.

**PROJECTS — 1981**

| PROJECTS — 1981 | **Cost to UNEP (US dollars)** |
|---|---|
| • Environmentally Sound and Appropriate Technologies — Management Co-ordinated and Monitoring System of ESAT Network (Phase I) | 2,330.00 |
| • Co-operation with ECE for Implementation of Declaration on Low and Non-waste Technology and Completion of a Compendium | 74,669.90 |
| • Management of Water Hyacinth *(Eizchhornia crassipes)* | 52,978.38 |
| • Training Seminar on Biogas in China | 11,576.64 |
| • Workshop on Biotechnology and Resource Recycling | 18,896.11 |
| • Information Dissemination of Environmentally Sound and Socially Appropriate Food Processing Technology | 6,875.00 |
| • Biotechnology — the Environment and Development (Preparatory Activity) | 7,584.20 |
| • Microbiological Leaching of Metal from Ores, State of the Art Review and International Training Course and Workshop | 73,270.00* |
| • Environmental Protection by Utilization of Slag-silt Wastes | 163,750.00* |

# Oceans



## Background

Although the environmental problems of the ocean are global in scope, a regional approach to solving them seemed more realistic.

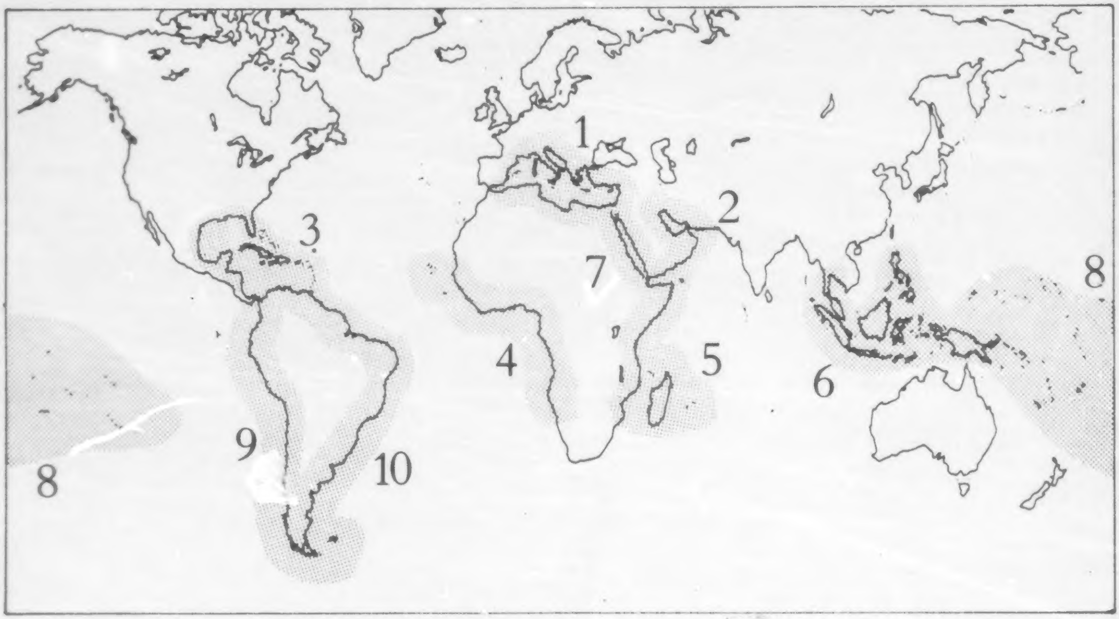
By adopting this regional approach, UNEP felt it could focus on specific problems of high priority to the States of a given region, thereby more readily responding to pressures on national resources. It was thought that undertaking activities of common interest to coastal States on a regional basis should, in due course, provide the basis for dealing effectively with environmental problems of the oceans as a whole.

Two elements are fundamental to UNEP's Regional Seas Programme:

- *Co-operation with the Governments of the Regions:* Since any specific regional programme is aimed at benefiting the States of that region, Governments are encouraged to participate from the very beginning in the formulation of the programme. After approval, the implementation of the adopted programme is carried out by national institutions which have been nominated by their Governments;
- *Co-ordination of the technical work through the United Nations system:* Although the regional programmes are carried out predominantly by government-nominated institutions, assistance to these national institutions is provided by a large number of the United Nations specialized organizations. UNEP acts as an overall co-ordinator, but in some cases this role is limited to the initial phase of the activities. Thus the support and experience of the whole UN system contributes to the programme.

The components of a regional

# Oceans



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**The Regional Action Plans: 1. Mediterranean; 2. Kuwait; 3. Caribbean; 4. West and Central African; 5. East African; 6. East Asian; 7. Red Sea and Gulf of Aden; 8. South-West Pacific; 9. South-East Pacific; and 10. South-West Atlantic.**

programme are outlined in an "action plan" which is formally adopted by the Governments before the programme enters an operational phase.

Each action plan consists of three standard components as adopted by the UN Conference on the Human Environment and endorsed by subsequent meetings of the UNEP Governing Council. They are:

- *Environmental assessment:* The assessment and evaluation of the causes, magnitude and consequences of environmental problems are essential activities providing the basis for assistance to national policy-makers to use their natural resources in an effective and sustainable manner.
- *Environmental management:* A wider range of activities requiring regional co-operation falls under this heading — rational exploitation of living resources, utilization of renewable sources of energy, management of freshwater resources, disaster preparedness and co-operation in cases of emergency, etc. Regional conventions, elaborated by specific technical protocols, usually provide the legal framework for the action plan and have in many regions proved to be an excellent tool in the hands of environmental managers.
- *Supporting measures:* The national institutions are the institutional basis for the implementation of the action plan. Large-scale technical assistance and training are provided where necessary to allow their full participation in the programme. Existing global or regional co-ordinating mechanisms are used when appropriate. However, specific regional mechanisms may be created if Governments feel they are necessary. Public awareness of environmental problems is stimulated as an essential support measure for the action plan. Financial support is initially provided by UNEP and other international and regional organizations, but as the programme develops, it is expected that the Governments of the regional will assume increasing financial responsibility.

In spite of similarity in the structure of the action plans, their contents are very different as they reflect the specific priorities, needs and possibilities of the individual regions.

At present there are ten regional seas areas where action plans are operative or are under development: the Mediterranean (1975); the Red Sea

(1978); the Wider Caribbean region (1981); the West and Central African region (1981); the East Asian Seas (1981); the South-East Pacific (adoption expected in 1982); the East African region (adoption expected in 1984); and the South-West Atlantic (adoption expected in 1983).

**The Mediterranean**

The Mediterranean was an ideal place to begin the UNEP Regional Seas Programme, since the Mediterranean Sea is subjected to pollution stress of every variety. It is a relatively well-known sea, scientifically speaking, and has great importance due to the dependence of millions of its coastal inhabitants on its resources. In 1977, 830,000 tonnes of fish worth US$1.3 billion were caught in the Mediterranean. More than 100 million tourists migrate to its coasts every year, to join the 100 million people already inhabiting the coastal zone.

The main pollution problems of the Mediterranean coastal areas are caused by a general lack of adequate treatment of domestic sewage and industrial discharges, the use of pesticides in agriculture, and oil pollution from accidental and operational discharge from vessels. The factors contribute to a general pollution load of toxic chemicals in sediments and biota, an overload of nutrients in certain areas with a resulting increase in BOD, and occurrence of pathogenic organisms in waters and shellfish. The state of open waters is not yet critical, but many coastal zones are considered badly polluted.

Since 1975, when the Mediterranean Action Plan was adopted, a pollution monitoring and research programme MEDPOL was launched as the most comprehensive pollution research effort ever attempted in the area. Designed to draw upon existing research facilities of the region, the original programme consisted of seven pilot projects. Four of these entail monitoring of environmental quality for the level of selected pollutants, and three deal with research on the behaviour and effects of pollutants in the marine environment. At present, 84 institutions in 16 Mediterranean countries are participating in MEDPOL.

Three international agreements were adopted in 1976: (1) the Convention for the Protection of the Mediterranean Seas against Pollution; (2) the Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft; and (3) the Protocol on Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency.

In February 1978, the convention and protocols entered into force, and to date 15 Mediterranean States and the European Economic Community (EEC) have ratified them.

A regional Oil Combating Centre was established in Malta in December 1976 with the primary objectives of providing a mechanism for exchange of data relevant to oil pollution, training in oil pollution control techniques, and assistance in designing contingency plans.

Since the data from MEDPOL have confirmed the suspicion that most pollution in the Mediterranean comes from land-based sources, Mediterranean countries have pursued the development of a new treaty to control these sources. Following several years of intensive preparatory work, the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources was signed in May 1980 by 12 Mediterranean States and EEC.

Environmental management activities are centred around the Blue Plan and the Priority Actions Programme (PAP) for the Mediterranean.

The Blue Plan, as the study of major development issues requiring regional co-operation, is the conceptual backbone for PAP, which includes intercountry co-operation on development of aquaculture, development and application of renewable sources of energy, protection of soil from degradation, improvement of human settlements, utilization of freshwater resources and development of alternative patterns of tourism.

UNEP, as the organization discharging secretariat functions for the Mediterranean (Barcelona) Convention, co-ordinates the implementation of the Mediterranean Action Plan with the co-operation of 14 international organizations, most of them specialized agencies of the United Nations.

The Governments of the regional are financing the activities agreed upon as part of the action plan through a Trust Fund which UNEP continued to administer in 1981, through its Co-ordinating Unit for the Mediterranean Action Plan. Voluntary national contributions for 1981 amounted to US$1,890,000 and the UNEP contribution, subject to availability of funds, is set at $205,000.

All Mediterranean coastal States, with the exception of Albania, and the European Economic Community became contracting parties to the Barcelona Convention, and the European Economic Community approved the protocol on co-operation in cases of emergencies.

### The Red Sea and the Gulf of Aden

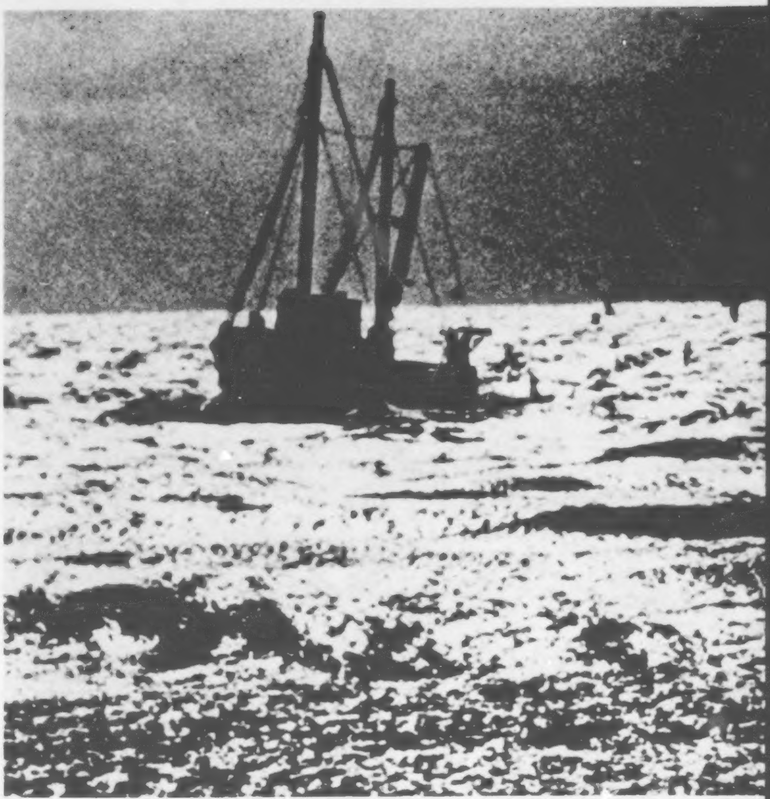
The Red Sea is of unique geological and biological interest. It seems to be a new ocean in the first stages of formation. The possible effect of its elevated temperatures and salinities on it marine inhabitants, the presence of endemic species, the relatively low species diversity compared with that of the Indian Ocean, and the possible effect of the Suez Canal on species composition on either side are all questions that render the sea especially intriguing to scientists.

Today this region is relatively unpolluted, but a rapid increase in oil exploitation, production and shipping is taking place, and the environmental impact is expected to be considerable. Pollution by oil from accidental spills and intentional discharge from ships and land-based sources, as well as the physical disturbances resulting from construction and dredging operations, may place undue stress on marine ecosystems.

In January 1976, under the aegis of ALECSO an intergovernmental meeting in Jeddah adopted the action plan for the protection of the Red Sea and the Gulf of Aden. The action plan calls for intensive development of the region's capabilities in the field of basic and applied marine sciences and for the adoption of a regional convention for the protection of the Red Sea and the Gulf of Aden.

Under the co-ordination of ALECSO, and with support of UNEP and other organizations, activities in 1981 centred on training marine scientists, development of marine science laboratories in the region, and organizing study tours. A number of small seminars, workshops and training courses were held and others are planned.

In January 1981, a Meeting of Legal and Environmental Experts prepared a revised draft action plan, a regional convention and protocol. These draft documents will be submitted in early 1982 to a Conference of Plenipotentiaries for consideration and approval.



### The Kuwait Action Plan Region

The region includes the coastal areas of Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates as well as the body of water encompassed by this coastline. This area is undergoing the world's most rapid economic development: average investment per kilometre of coastline is between US$20 and US$40 million. About 60 per cent of all the oil carried by ships throughout the world, about a billion tonnes per year, is exported from this region, passing through the narrow Strait of Hormuz.

The action plan, adopted in April 1978 by the Governments of the region, included two legal instruments: The Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution, and the Protocol Concerning Regional Co-operation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency. Both of them have been ratified and came into force in mid-1979.

The action plan calls for a large number of projects to deal with such matters as the origin and magnitude of oil pollution; an evaluation of all industrial wastes and municipal sewage reaching the sea; stock assessment of commercially important species of fish and shellfish; and the ecological effects of coastal engineering and mining.

It also calls for activities related to contingency planning for accidents arising from oil exploration, exploitation and transport, and to environmental engineering, public health problems, aquaculture, marine parks, port pollution and freshwater management. Intensive training programmes and public awareness campaigns are included.

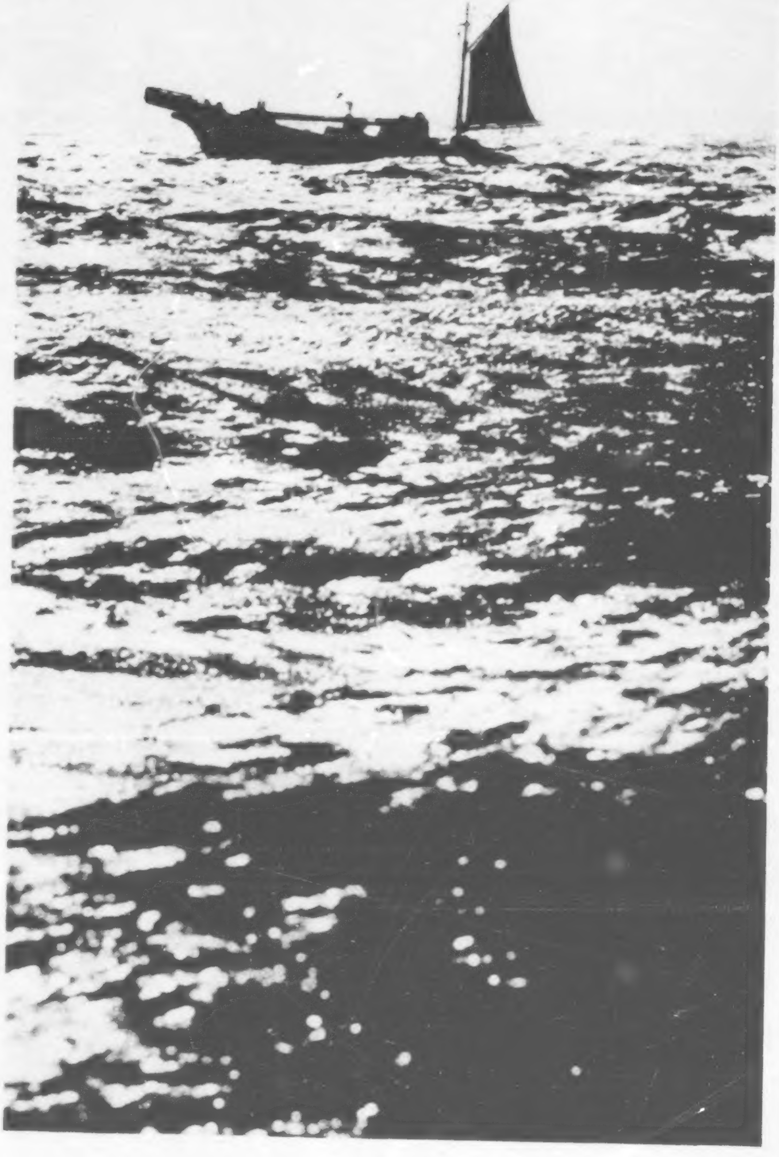
Preparations are under way in the framework of the action plan for the establishment of a Marine Emergency Mutual Aid Centre in Bahrain to co-ordinate action against pollution by oil and other harmful substances.

As from 1 January 1981, the Organization for the Protection of the Marine Environment formally assumes responsibility for the oceanographic and marine pollution assessment project of the action plan. These plan components, designated for implementation during 1982-1983 by the 1981 Annual Expert Review Meeting, have become the responsibility of two task forces, which have since met twice to adopt specific sampling and analytical methodology. They have also selected monitoring sites for a two-year pilot study of oceanography and selected marine pollutants of the region.

During this study period, UNEP is requested to continue providing substantial support to the Secretariat for the Regional Organization, especially in respect of soliciting assistance from the United Nations and other international organizations.

### The West and Central African Region

The West and Central African region, defined as including the marine environment and coastal areas of coastal areas of 20 states—from Mauritania in the north to Namibia in he south—faces many common



environmental problems. Among these are pollution from petroleum hydrocarbons (mainly from maritime transport) from agricultural and industrial wastes and from untreated or insufficiently treated sewage. All these sources of pollution may affect population, fisheries resources, marine and coastal ecosystems, and the tourist industry.

Concrete preparatory activities for the development of a comprehensive programme for this region began in 1976, and in November 1979 a meeting of government-nominated experts in Libreville reviewed the entire programme—assessment, management and legal components—as outlined in the draft of the plan.

In the light of the recommendations of the meeting, UNEP continued in 1980 to co-ordinate the completion of the preparatory studies and activities. And in March this year, a Conference of the Plenipotentiaries of West and Central African States adopted an Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the West Central African region; a Regional Convention and Protocol.

The conference agreed on the establishment of a regional trust fund of US$2.5 million to finance the activities called for by the Action Plan over a two-year period and designated UNEP as the co-ordinator for the implementation of these activities.

A Steering Committee for the Marine Environment, composed of representatives of West and Central African States, has been set up to provide UNEP with policy guidance. At its first meeting in July, the committee agreed to include the following in the 1982-1983 work programme: Institution and co-ordination of national contingency plans; control of coastal erosion; monitoring of marine pollution; and support of measures on training, documentation and legislation.

### The Carribean Region

The Caribbean region comprises an assortment of complex and fragile tropical and subtropical ecosystems which extend throughout the Carribbean Sea and Gulf of Mexico west of the Greater and Lesser Antilles. The region has 19 island nations which share the common problem of the extreme fragility of their ecosystems. Just as islands dare not risk following patterns of development created for continental land masses, care must be taken when applying development patterns first pursued by countries in temperate climates to the Caribbean's distinctive environment.

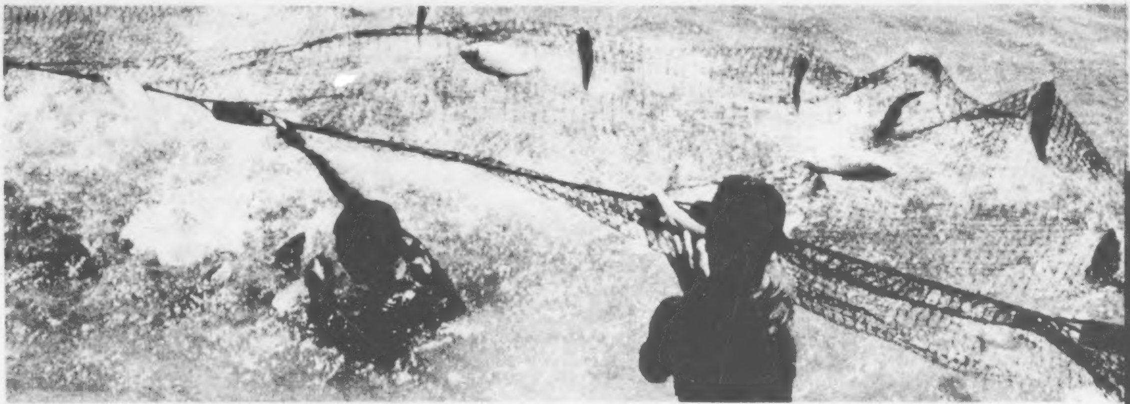
Most of the Caribbean States are developing countries whose major problem is to fulfil people's basic needs, and their desire for an action plan reflects a conviction that environmental management is a necessary feature of development, regardless of the stage that development has reached.

The preparatory phase of the Caribbean Action Plan started in 1979 through a Caribbean Environment Project team in Trinidad, jointly co-ordinated by the Economic Commission for Latin America (ECLA) and UNEP.

A draft of the plan and the supporting documentation were reviewed by two meetings of government-designated experts in Venezuela in January 1980, and in Managua in February this year. The action plan was then adopted by Governments at an Intergovernmental Meeting held in Montego Bay in April. The meeting established a priority programme and assigned the co-ordination for the implementation of the action plan to UNEP through a regional co-ordinating unit to be established in Jamaica. It also set up a Trust Fund to support the implementation of the programme amounting to US$1.5 million for the 1982-1983 biennium.

A monitoring committee was created by the Governments in Montego Bay to oversee the implementation of the action plan and provide policy guidelines to UNEP. Colombia, Costa Rica, Cuba, the Dominican Republic, Grenada, France, Mexico, St. Lucia and Venezuela are serving as members of this committee which met initially at UN headquarters in New York in December.

Work is now in progress towards the adoption of regional conventions and protocols to provide the legal framework for the action plan. A meeting of government-designated legal experts has already met in New York to review draft regional agreements. A second meeting is



envisaged for mid-1982 and it is expected that the agreements will be adopted by a Conference of Plenipotentiaries in early 1983.

## The South-West Pacific Region

Discussions on an action plan for the South-West Pacific region, a wide area covering the islands of the South Pacific, were initiated by the South Pacific Commission (SPC) in 1974.

Based on a broad consensus on the part of all interested parties—the South Pacific Bureau for Economic Co-operation (SPEC), the Economic and Social Commission for Asia and the Pacific (ESCAP), organizations of the UN system—a joint SPEC/SPC/ESCAP/UNEP co-ordinating group is supervising the preparation of documents for a Regional Conference on the Human Environment in the South-West Pacific Region, planned for 1982. The documents, based primarily on country reports, are:

- a Report of the State of the Environment in the South-West Pacific Region;
- a draft Delcaration of Principles on the Management and Improvement of the Environment in the South-West Pacific Region;
- a draft for a regional plan on development and environmental protection with proposals and specific co-operative projects to be implemented at the international, regional, national and local levels;
- proposals for the administration and financing of the action plan.

## The South East Pacific Region

In November this year, an Action Plan for the Protection of the Marine Environment and Coastal Areas of the South-East Pacific was adopted at a Conference of Plenipotentiaries convened jointly by UNEP and CPPS. The signatories were: Chile, Colombia, Ecuador, Panama and Peru.

The plan contains three annexes:

- a convention for the Protection of the Marine Environment and the Coastal Zones of the South-East Pacific (Lima Convention);
- an agreement on regional co-operation for pollution abatement.
- institutional and financial arrangement for the implementation of the action plan.

# Oceans

### The East Asian Seas

In the East Asian region, the complexity of marine pollution problems and their impact on the coastal environment were recognized a long time ago. In order to cope with them effectively a subregional approach was adopted, and the subregion of the ASEAN countries was selected as the first one that should be dealt with.

As part of the preparatory activities for an action plan, several pilot projects are now under way, in collaboration with ASEAN countries, covering subjects such as regional oil spill contingency planning, toxicity of oil dispersants, land-based pollution sources, river pollution transport, impact of pollution on mangrove ecosystems and of oil pollution on living aquatic resources, and environmental problems of offshore exploration and exploitation. Legal instruments for marine pollution control are also under consideration and preparation.

The draft action plan met with agreement at the second meeting of the ASEAN Experts on the Environment in Penang, September 1979. This meeting also established a list of seven priority items requiring early action.

The draft plan was further reviewed by meetings of scientific and legal experts in the summer and autumn of 1980. It was then adopted by an intergovernmental meeting held in Manila in April.

In a second intergovernmental meeting in December, a Trust Fund was established for 1982-1983 and five priority projects were chosen for implementation, each one to become the responsibility of a regional focal point. In additon, institutional arrangements for implementing the action plan were decided.

At the policy-making level, co-ordination will be the responsibility of the five national focal points meeting periodically as the Co-ordinating Body of the Seas of East Asia (COBSEA). UNEP has been asked to provide technical co-ordination for the first two years of the programme.

During the period January through March 1982, the five priority projects will be further developed into an operational plan. Final technical decisions concerning the implementation of the projects will be the subject of the first COBSEA meeting to be held in April 1982. It is expected that the five projects will be initiated immediately afterwards.

### The East African Region

This comprises the marine and coastal environment of eight states: Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, and United Republic of Tanzania.

The Indian Ocean in general is characterized by a lower rate of biological productivity than the Atlantic or Pacific owing to its relatively small continental shelf area—the shelf is especially narrow along the East African Coast. The shelves are fringed with coral reefs, and the inter-reef areas are important as trawlable grounds.

The ocean contains between 3,000 and 4,000 species of shore fish, and its tropical beaches are considered among the richest in tropical marine fauna.

Mangroves abound near river estuaries, and extensive forests are found along the coasts of Mozambique, Tanzania, Kenya and southern Somalia, with some forests occurring in northern Madagascar. Many commercially important species are associated with mangroves, including the mangrove crab, mullet and oysters. The mangroves also serve as a nursery ground for penaid shrimp.

The area is faced with a number of threats which could affect the region's marine resources. Damage to coral reefs has already taken place, where the productive and heavily fished reef zone is close to shore and vulnerable to pollution and silting. Fishing with dynamite and poison has already destroyed some reef areas, although these methods have now been outlawed in Kenya and Tanzania.

The removal of mangroves to provide firewood, tannin, medicinal products, paper pulp and timber, and to open up new space for aquaculture, has already affected fisheries and altered the character of the environment in other coastal areas of the Indian Ocean and this threatens to become a similar problem in East Africa.

Pollution of the shoreline by oil is primarily due to slicks brought in coastal currents from spills in the open ocean. But operational discharge of tankers close to the shore is another problem. For example, the Somali coast is subject to oil pollution from ships clearing their holds before entering the oil ports. Existing refineries also cause periodic problems in localized areas, and more are being built.

Industrial pollution is not yet a severe problem but could become one. Effluents are often released with possibly serious consequences for fisheries.

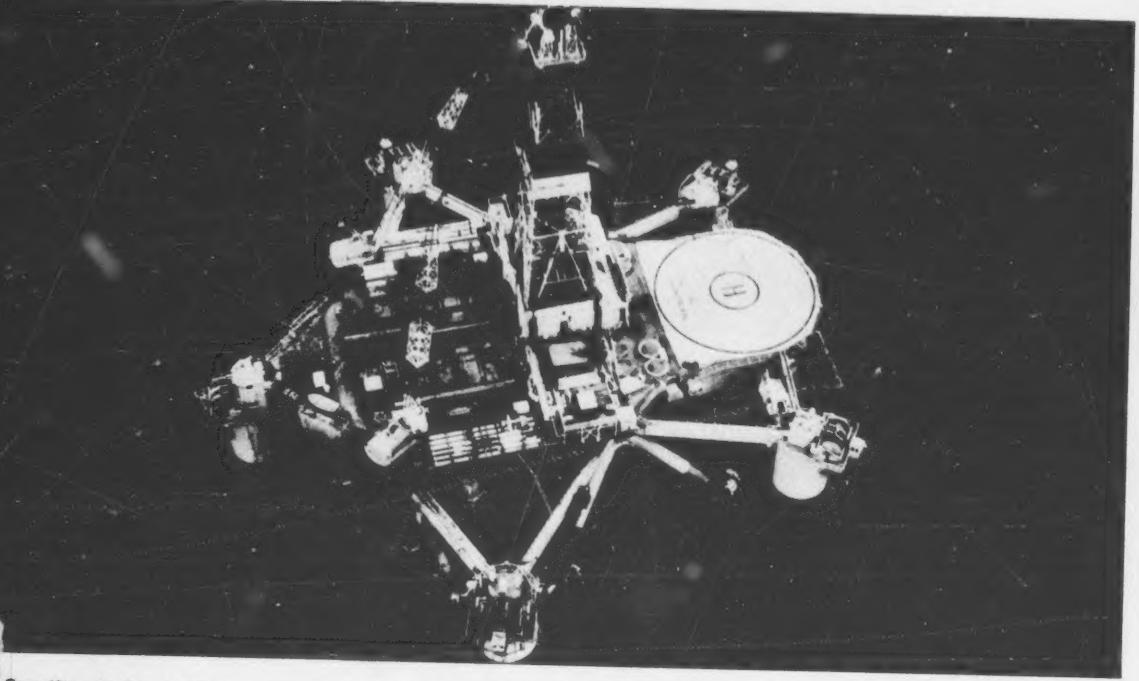
Small industries producing plastics, textiles, paper, sisal, sugar and phosphate, as well as tanneries and mining concerns, are found throughout the region. Agricultural chemical use is on the upswing, adding to the pollution load of lakes, rivers, and eventually the sea.

Like industrial pollution, sewage pollution of coastal waters tends to be localized. In some countries, sewage treatment is rudimentary or non-existent. Eutrophication often results and serious health problems for coastal inhabitants could appear.

### The South-West Atlantic Region

Consultations are under way on the eventual design and establishment of an Action Plan for the South-West Atlantic. The target date for adoption is 1983.

# Oceans



## Specific activities in 1981

*On the Mediterranean Action Plan*

An expert meeting in Geneva (January), convened in collaboration with FAO, WHO, WMO, UNESCO, IOC and IAEA; evaluated and assessed the results of phase I of MEDPOL; it also developed and endorsed a proposal for long-term Pollution Monitoring and Research Programme (MEDPOL — Phase II).

The Second Meeting of the Contracting Parties to the Barcelona Convention in Cannes (March) approved the budget for 1981 and discussed budgeting for 1982 and 1983. Long-term pollution monitoring and research on sources of pollution and on transport of pollutants through the atmosphere— together with an outline of research and study topics— were conceived to give support to the monitoring activity. The meeting also unanimously agreed on the transfer of the Co-ordinating Unit to Athens.

A *Blue Plan Focal Point Meeting* was convened in Arpil and the programme of activities for 1981 and 1982 was approved. As part of the activities for 1981, the Blue Plan's *Group of Co-ordination and Synthesis* met five times during the year.

The First Meeting of *the Working Group for Scientific and Technical Co-operation*, formed of the MEDPOL National Co-ordinators, reviewed in Athens (September-October) the basic criteria and mechanisms proposed by the MAB Co-ordinating Unit in collaboration with the co-operating agencies for the implementation of the national monitory programme and the research activities in the framework of MEDPOL — Phase II.

An expert meeting on the Protocol on Specially Protected Areas in Geneva (December) was convened to prepare for the meeting of the Plenipotentiaries to be on the same subject at the beginning of 1982.

### On the Carribean

- A meeting of government-designated experts convened in Managua (February) identified priority projects for the implementation of the Action Plan and recommended institutional and financial supporting measures.
- The subsequent Inter-governmental Meeting on the Caribbean Action Plan (Montego Bay, April) formally adopted the action plan and the institutional and financial support measures.
- UNEP Governing Council approved, with the endorsement of the UN Secretary General, the establishment of the Caribbean Trust Fund for an initial two-year period extending to 31 December 1983 to finance activities for the Caribbean Action Plan.
- In collaboration with several Caribbean Governments and international and regional organizations, UNEP prepared detailed descriptions for the priority projects identified on the Montego Bay meeting.

# Oceans

- An updated and expanded edition of the Directory of Marine Research Centre in the Caribbean was prepared and will be published in early 1982.
- The preparation of a comprehensive solid waste management programme for the smaller Caribbean islands was initiated in co-operation with CARICOM and PAHO as well as the initiation of a continuous coastal wider quality monitoring programme.
- A task force of environmental education experts for the Caribbean region was prepared. This draft convention together with a draft agreement for co-operation in combating pollution in cases of emergency prepared by IMCO was reviewed at a meeting of legal experts on the draft regional agreements for the Wider Caribbean region, held at the United Nations headquarters from 7 to 11 December 1981.
- The first meeting of the Monitoring Committee on the Action Plan or the Caribbean Environment Programme was held from 14 to 16 December 1981 at the United Nations headquarters in New York. Specific decisions were taken by the committee regarding the budget, institutional arrangements and programme development for 1982.

**On the West and Central African Region**

- The preparation of a Directory of African Marine Research Centres.
- a Second Meeting of Legal Experts on a Regional Convention and Protocol for the West African Region, at Abidjan (March).
- A conference of Plenipotentiaries on Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, Abidjan (March).
- A meeting of the Steering Committee for the Marine Environment, Abidjan, 22-23 July 1981.

Preparation of a programme document for 1982-1983 was initiated.

**On the South-East Pacific**

- An international oil spill training course (IMCO, CPPS, UNEP) in Viña del Mar, Chile (April).
- International workshop on "The Legal Practice for the Protection of the Marine Environment", Bogota, Colombia (May).
- A Joint UNEP/CPPS Government Experts Meeting to revise a draft action plan or the protection of the marine environment and coastal areas in the South-East Pacific, at Lima, Peru (September).
- A Joint UNEP/CPPS visit to Colombia, Chile, Ecuador, Panama and Peru to identify the priorities of those Governments in regard to the South-East Pacific marine environment (October).
- an intergovernmental meeting to review and adopt the action plan to protect the marine environment and coastal zones at Lima, Peru (November).

**In the East African Region**

As a preliminary initiative in the region, UNEP organized in October and November a joint UNEP/UN/UNIDO/FAO/UNESCO/WHO/IMCO/IUCN exploratory mission which visited the eight states of the region. The findings of the mission are being used to prepare sectorial reports on marine and coastal areas development, industrial sources of marine and coastal pollution, marine pollution, public health problems in the coastal zone, oil pollution control, and conservation of the coastal and marine ecosystems and living resources. A summary overview report on the environment problems of the East African region is also being prepared.

The report will be used by a workshop of experts from the region on the environmental problems of East Africa, tentatively scheduled for late 1982. On the basis of the results of the workshop, the first draft of a regional action plan will be prepared for consideration by the Governments of the region. It is expected that the final action plan may be adopted in 1984.

# Oceans

## PROJECTS — 1981

| | Cost to UNEP (US dollars) |
|---|---|
| World Register of Rivers Discharging into the Oceans | 3,633.00* |
| Support for GESAMP Working Group on the Interchange of Pollutants between the Atmosphere and Oceans | 2,546.61 |
| GESAMP Working Group on a Review of Health of the Oceans | 41,698.27 |
| Environmental Impact Assessment of Coastal Area Development (WHO) | 4,000.00 |
| Sea Disposal Studies | 7,595.00 |
| Meeting of Government Experts on Marine Pollution and Regional Seas Programmes | 11,500.00* |
| Development of a Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals | 40,824.93 |
| Promotion of the Establishment and Effective Management of Coastal and Marine Protected Areas | 49,123.00 |
| The Mediterranean Programme Activity (Implementation of the Action Plan Adopted at the Barcelona Meeting) Med.I | 148,320.82 |
| The Mediterranean Programme Activity: Intercalibration Measurements for Pilot Projects under the Co-ordinated Pollution Monitoring and Research Programme—Med IV | 943.00 |
| The Mediterranean Programme Activity: Joint IOC/WMO/UNEP Co-ordinated Pilot Project on Baseline Studies and Monitoring of Oil and Petroleum Hydrocarbons in Marine Waters (Operational Phase II)—Med. V | 7,853.86 |
| The Mediterranean Programme Activity: Joint IOC/UNEP Co-ordinated Pilot Projects on Problems of Coastal Transport of Pollution—Med XI (Operation Phase II) | 8,796.48 |
| Regional Environmental Programme for the Red Sea and the Gulf of Aden (Phase I) | 50,000.00* |
| Programme Activity Centre for Regional Seas | 1,079,871.52 |
| Development of Comprehensive Action Plan for the Protection of the Marine Environment of Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates | 34,518.63 |
| Co-ordination of the Joint UNDP/UNEP Co-operative Projects in the Mediterranean | 2,866.19 |
| Impact of Pollution on the Mangrove Ecosystem and its Productivity in South East Asia—Preparatory Phase | 56,520.45 |
| Workshop on Coastal Area Development and Management in South-East Asia | 24,463.57 |
| River Inputs to South-East Asian Seas | 222.50 |
| Research Toxicity of Oil Dispersant Chemicals on Tropical and Sub-tropical Marine Species | 3,646.00 |
| Overview of Land-based Pollution Sources in South-East Asa | 2,282.00* |
| IMCO/UNEP International Workshop on the Prevention, Abatement and Combating of Pollution from Ships in South-East Asian Waters | 27,591.00* |
| Development of an Environmental Programme for South-West Pacific | 90,133.00 |
| Survey of Oil Pollution Problems of the West African Region's Coast with Particular Emphasis on Pollution from Shipping Activities | 2,521.00 |
| Survey of Marine Pollutants from Industrial Sources in the West African Region I | 2,341.00 |
| Development of a Comprehensive Action Plan for the Protection and Development of the Marine and Coastal Areas of the West Africa Region | 280,002.92 |
| River Inputs to the West African Region | 1,029.72 |
| Development of an Action Plan for the South-East Pacific | 87,949.39 |
| Preparation and Management of a Regional Seminar/Workshop on Coastal Area Development and Management in West Africa | 102,273.02 |
| Development of a Comprehensive Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Region | 61,442.40 |
| IMCO/UNEP International Workshop on Combating Marine Pollution from Oil Exploration, Exploitation and Transport in the Kuwait Action Plan Region | 2,061.00 |
| Protection of the Marine and Coastal Environmental of the Caribbean Islands | 32,901.00 |
| Formulation of Caribbean Oil Spill Control Plan | 7,142.00* |

* Commitments

# Ecosystems

82

# Ecosystems

TROPICAL FORESTS represent some of the most valuable natural resources on earth. They supply goods and services of many different kinds to humanity. They contribute not only to the quality of material goods, but to the quality of life in general. Tropical forests rank among the least developed of all natural resources in most countries of the world, so that their potential contribution to mankind's welfare has scarcely been tapped. This is one of the challenges for the New International Development Strategy.

The world-wide assessment of tropical forest resources, carried out jointly by UNEP and FAO within the framework of the Global Environmental Monitoring System (GEMS) programme, was completed in 1981. The results of the study provided reliable information on the areas, growing stock, logged area and ownership of the tropical forests and the rate of deforestation and tree plantation in the tropics. In 1980 the world's tropical forests—with the exception of the tropical parts of Australia and the Arabian Peninsula—covered 1,935 million ha, of which 1,200 million ha were closed (humid) forest and the rest open forests.

The closed forests were being deforested at an annual rate of 0.62 per cent, or 7,469 million ha a year. This rate was 0.52 per cent or 3,807 million ha for the open forests, giving an overall rate of 0.58 per cent deforestation for the tropics.

The estimates were that if deforestation continued at its present pace, approximately 12 per cent of the existing tropical forests would have been lost by the year 2000. The total area of tree plantation in the tropics was 11,511 million ha in 1980. Only 1,099 million ha, an area less than one tenth of the forests lost to deforestation, was being planted each year.

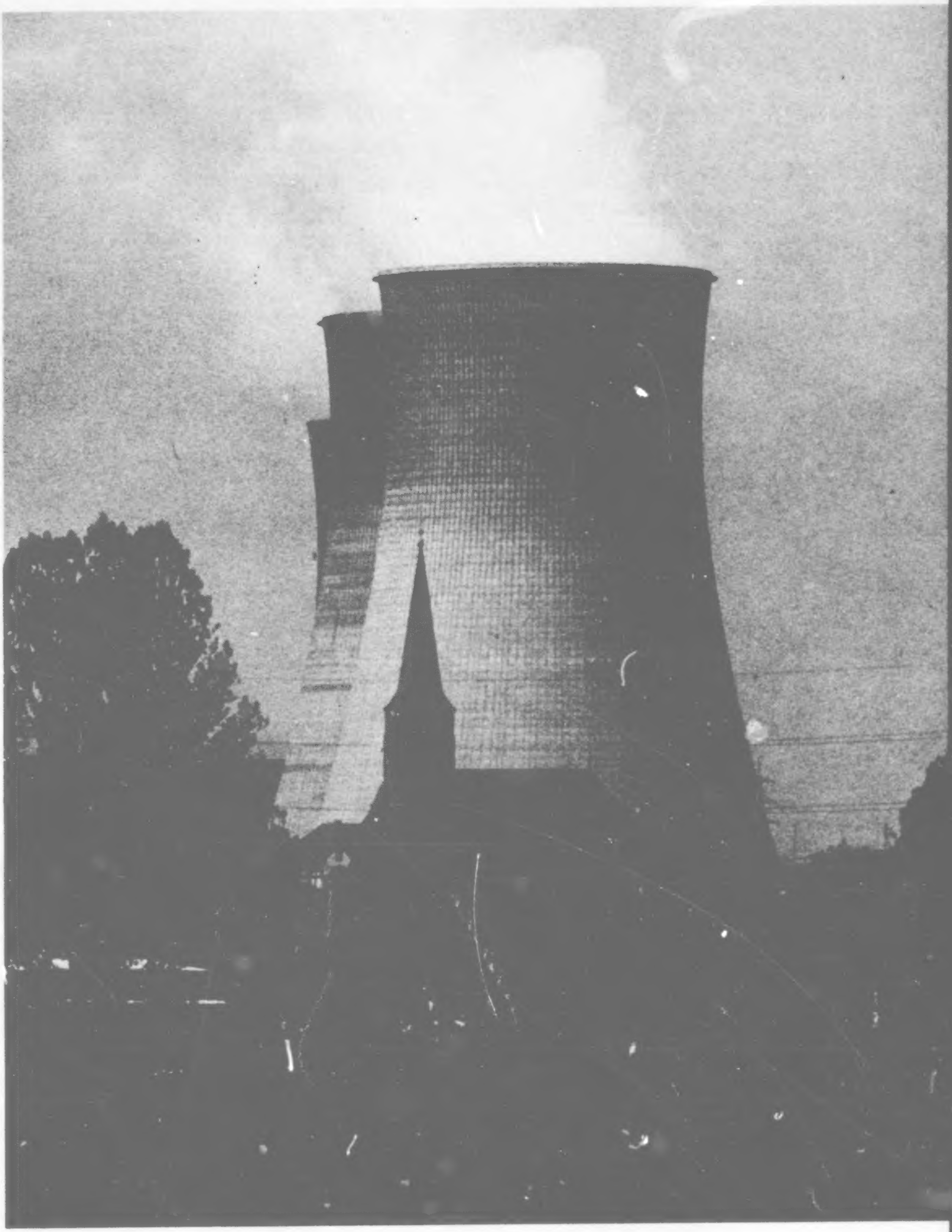
## Specific activities in 1981

- Preparations were in progress for a second experts meeting on tropical forests, scheduled for January 1982 in Rome. A discussion paper was prepared under the joint sponsorship of UNEP, FAO and UNESCO, based on the recommendations of an earlier meeting and comments of Governments, UN agencies and other organizations.
- The second experts meeting is expected to formulate an internationally co-ordinated action plan for the rational management of tropical forest resources.

## PROJECTS — 1981

| | Cost to UNEP (US dollars) |
|---|---|
| • Assistance to the Mongolian People's Republic on the Establishment of the Great Gobi National Park, Mongolia | 251,919.06 |
| • Pilot Project on Tropical Forest Cover Monitoring | 1,172.70* |
| • Pilot Projects in Ecological Training and Management in Tropical Forest Areas as a Basis for Environmentally sound Development | 10,360.15 |
| • International Post-graduate Training Course on Ecomanagement for Developing Countries at the Technical University of Dresden | 142,608.44 |
| • The Preparation of an Internationally Co-ordinated Programme for the Wide Exploitation of Tropical Forests and Woodlands | 17,424.93 |
| • Integrated Research Training and Information Programme in the Andean Region, with Special Reference to Problems of Land Use Alternatives, Human Settlements and Migration, Tourism and Conservation | 7,562.00 |
| • Integrated Research and Training Programme in the Andean Region: Land Use Alternatives, Human Settlements and Migration, Tourism and Conservation | 1,130.71 |
| • Support to the Fourteenth Pacific Science Congress, Khabarovsk, USSR, 20 August to 5 September 1979 | 3,926.16 |
| • Workshop on African Limnology | 9,809.00* |
| • Regionalization of the "Ecotheque Mediterraneane": Preparatory Phase | 10,076.32* |
| • Conservation Strategies for Critical Ecosystems, Especially Coastal and Freshwater Ecosystems | 54,257.00 |

* Commitments



# Environmental Law

GOVERNMENTS are increasingly aware of the importance of environmental law as a tool for checking the adverse effects of man's activities and natural processes on the environment. However, the development and application of environmental law are inevitably slow procedures.

At the international level a number of international treaties and agreements have been adopted, but their provisions do not always meet required standards in respect of effective environment protection, nor are they fully elaborated. The attendant problems of bringing them into force and their full application are also important factors. Some of the existing conventions need up-dating or revising; in other areas, there is no international law at all.

At the national level, the enactment of legislation necessary to enforce existing international environmental agreements, or to deal with national environmental concerns, may not have been effected or is delayed due to limited human and financial resources and institutional back-up.

The Environmental Law programme of UNEP is therefore aimed at identifying areas where supplementary action or new initiatives are required and in promoting appropriate action through international co-operation and assistance, technical and otherwise. The main objectives of the Programme are:

- To contribute towards the development and codification of a new body of international law to meet new requirements generated by environmental concerns and by international strategy in the field of the environment;
- To facilitate co-operation among States for the development of international law regarding responsibility, liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of States to areas beyond the limits of their jurisdication;
- To contribute towards the development of environmental law on the national and regional levels;
- To promote the protection of international commons and the regulation of their use from the environmental point of view;
- To work towards establishment of guidelines and procedures for the avoidance and settlement of environmental disputes;
- To study institutional structures related to environmental concerns with the aim of devising efficient new mechanisms or improving existing ones.

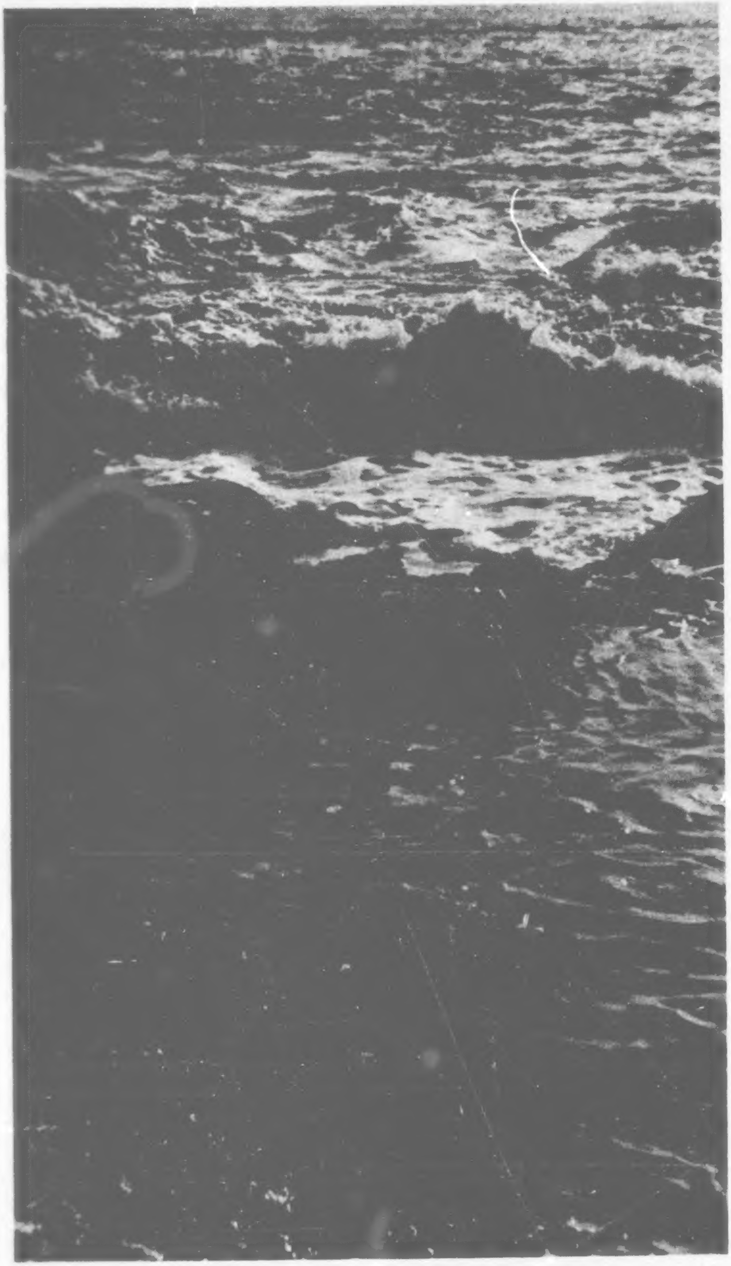
A number of international organizations, both within and outside the UN system, as well as Governments are undertaking a wide range of activities related to these programme objectives. The Environment Law Unit seeks to ensure that these activities are planned and carried out in a co-ordinated manner and that additional action is initiated to fill gaps as they appear.

Similarly, the unit works closely with other UNEP programmes to ensure that legal considerations are taken into account — in particular in the areas of Regional Seas, Conservation, Outer Limits and Basic Human Needs, with respect to the problems of weather modification and the protection of the ozone layer.

### Specific activities in 1981

- Maintenance of an up-dated register of environmental conventions and analysis of their status of application;
- Compilation of selected multilateral treaties in the field of the environment;
- Completion of a study on the legal aspects of preventive and corrective measures concerning marine pollution from off-shore mining and drilling within the limits of national jurisdiction *(Geneva, February 1981)*;
- Survey of international co-operation in the field of the environment concerning natural resources shared by two or more States;

# Environmental Law

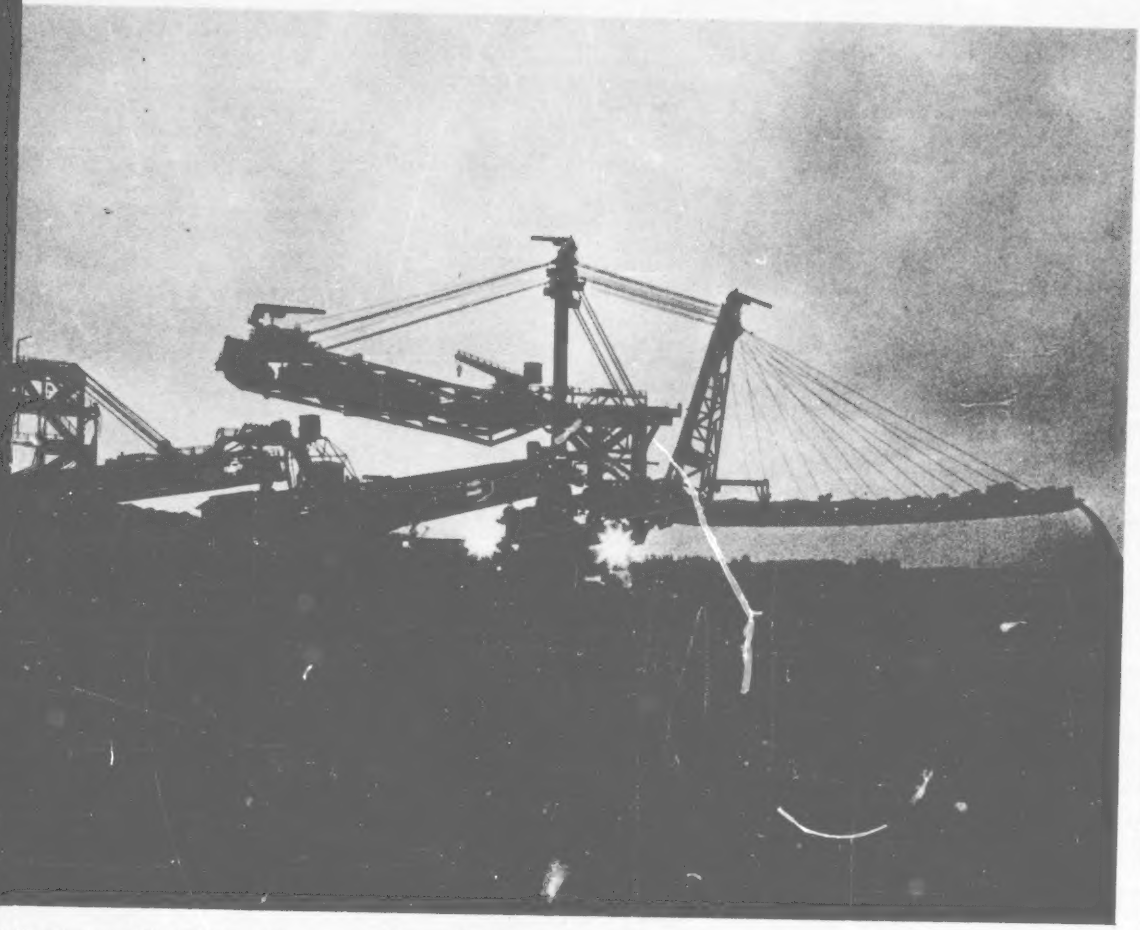


- Participation in the work of the third UN Conference on the Law of the Sea and the monitoring of its environmental implications;
- Collection of national environmental legislation;
- The convening of the *ad hoc* meeting of Senior Government Officials Expert in Environmental Law — *Montevideo, October — November 1981)* and its preparatory meetings *(Meeting of Experts of Some Developing Countries on Environmental Law, and Working Group of Experts on Environmental Law, both in Geneva, September 1981);*
- Preparation of the meeting of the *ad hoc* Working Group of Legal and Technical Experts for the Elaboration of a Global Framework Convention for the Protection of the Ozone Layer.

**PROJECTS — 1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| • Development of Legislation for Environmental Protection in the ECA Region | 20,542.93* |
| • Publication of Register of Multilateral Conventions and Protocols in the Field of the Environment | 44,493.51 |
| • Ad-hoc Meeting of Senior Government Officials Expert in Environmental Law—Phase I | 68,607.22 |
| • Production of a Handbook on National Environmental Machineries and Legislation | 6,000.00 |
| • Working Group of Experts on Environmental Law for Pollution and Other Environmental Damage | 48,881.15 |

# Environment and Industry



THE objectives of the Industry and Environment Office of UNEP were redefined during the drafting process for the System-wide Medium-term Environment Programme (SWMTEP).

The over-all objective is: *to develop and promote the application of criteria which will be internationally recommended and methods for environmentally sound industrial and transportation practices, including the planning, siting and operation of industrial plants and transportation systems, the choice of production technology and the design of production processes with a view to minimizing adverse environmental impacts, including those on the working environment, and to conserve resources.*

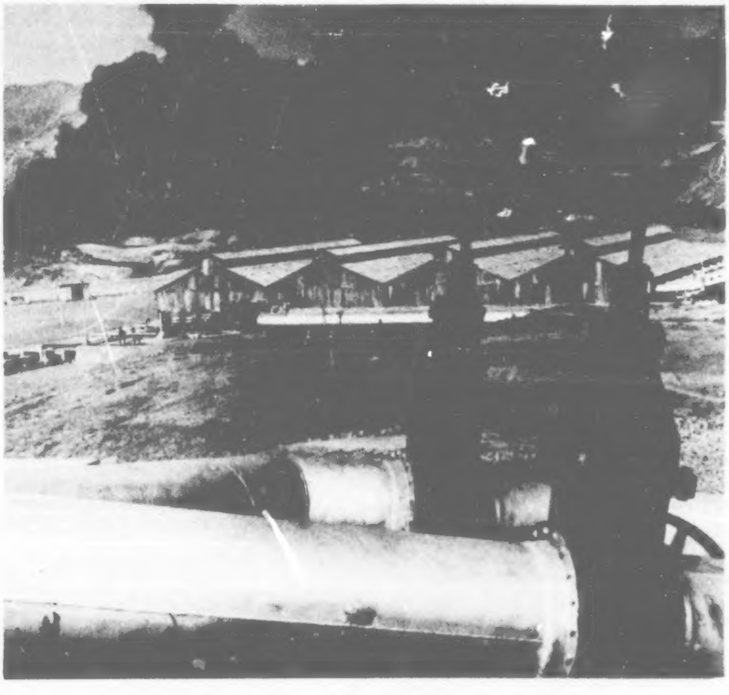
There are three main sub-programmes of the office, and the objectives of these are defined as follows:

- to review and assess environmental and resource implications in agro-industries, forest products, chemicals, metallurgy, petroleum, building materials, construction, textiles and clothing, mineral extraction, motor vehicles, other transportation and tourism. Other industries may be added as need arises;
- to prepare guidelines and manuals on environmental management for each of the activities to be reviewed and assessed under the previous sub-programme with a view to providing technical guidance

# Industry and Environment

regarding environmental aspects of industrial siting and pollution prevention and control in the design, construction and operation of industrial plants and facilities and of transportation systems;

- to review, collate and disseminate national legislation and practices in respect of environmental standards related to industry and transportation, including working environment standards, and their application;
- to develop procedures, methodologies and institutional mechanisms for environmental management in industry and transportation;
- to develop and apply low-waste and non-waste technologies and the recycling and use of waste material and residues;
- to develop international environmental data bases for industry and transportation in the light of emerging needs, and promote their compatibility and inter-linkages with other data accessible through international sources;
- to assist countries in developing capabilities for environmental information systems for industry and transportation, and facilitate access by them to the international systems;
- to assist countries at the regional, sub-regional and national levels; in the assessment of manpower needs, the development of training programmes and materials; and the strengthening of relevant institutions for environmental assessment and management of industry and transportation;
- to prepare and disseminate environmental information for industry and transportation.



Among the strategies for meeting these objectives are:

- enlisting the co-operation of Governments, industry and relevant international institutions (including trade unions) in organizing industrial sectoral and intersectoral workshops and technical groups, defining and analysing relevant problems and proposing specific solutions;
- testing and monitoring the application of methodologies and criteria for impact assessment and environmental criteria for industrial siting in different regions of the world;
- testing and applying specific criteria for incorporating environmental parameters into industrial siting in various regions with different physical and socio-economic conditions;
- encouraging the development and implementation of resource-conserving and pollution prevention policies in relation to specific sectors of industry;
- disseminating and promoting an exchange of industrial-environmental information and experience through a computerized information storage and retrieval system; and
- integrating industrial-environmental aspects into education and training programmes for managers, engineers and workers.

### Specific activities in 1981

In applying these strategies in the year under review, the Industry and Environment Office — together with other UN organizations — undertook a programme of work leading to the preparation and dissemination of the following reports and documents:

- a manual on *Environmental Management in the Pulp and Paper Industry* (UNEP/IVL/SIDA) — completion of the 2-volume manual;
- Proceedings of the UNEP Workshop on the *Environmental Aspects of the Iron and Steel Industry*, incorporating a report by the Secretariat on the State of the Art;
- technical review on the *Environmental Aspects of Aluminium Smelting*;

# Industry and Environment

- draft guidelines on *Application of Chemical Dispersants and Environmental Aspects* (IMCO/UNEP);
- draft guidelines on *Risk Management and Accident Prevention in the Chemicals Industry;*
- draft guidelines on *Management in Agricultural and Agro-industrial Residues Utilization;*
- draft guidelines on *Reduction of Post Harvest Losses.*

*Other specific activities in 1981 included:*

- an environmental consultative committee meeting on the petroleum industry (Paris);
- regional experts workshops: on industrial environmental impact assessment and environmental criteria for the siting of industry (Kuala Lumpur); and on control of emissions from motor vehicles, a WHO/UNEP workshop (Moscow);
- a UNEP/UNIDO workshop on the environmental aspects of alumina production (Paris);
- a workshop on the environmental aspects of the non-ferrous metals industries (cadmium, copper, lead, zinc and nickel) (Geneva);
- publication of four (quarterly) issues of the *Industry and Environment* newsletter, and of a special issue on cost-benefit analysis;
- preparation of topic files on pollution abatement control technologies, discharge and emission standards and ambient quality standards answering queries on environmental management in industry.

| **PROJECTS — 1981** | **Cost to UNEP (US dollars)** |
|---|---|
| • On-going consultation relationship with specific industries | 993,050.00 |
| • Operation of a computerized industrial environmental information storage retrieval and dissemination system | 169,000.00 |
| • Regional training workshops on environmental management in the pulp and paper industry | 79,650.00 |

# Natural Disasters

EXTREME natural phenomena of geophysical or climate origin like earthquakes, floods, tsunamis, volcanic activity and tropical cyclones can cause widespread and severe physical, ecological and socio-economic damage to large areas. Often these events cannot be coped with by the affected community alone; in these circumstances, intensive aid is needed from national and international organizations.

In this programme area, only natural disasters of sudden onset are dealt with. Those of slow onset (e.g. drought) or those directly affecting health fall under other programme areas.

In accordance with the 1978 Memorandum of Understanding between eight UN organizations, UNEP's activities have been aimed at:

- development of early warning systems;
- establishment of long-range policies and programmes to prevent or eliminate the occurrence of disasters;
- research on man's activities which may affect the occurrence of disasters; and
- providing information to national planning and regulatory bodies concerning disaster prevention or mitigation through the International Referral System.

**Specific activities in 1981**

- As part of the Typhoon Operational experiment (TOPEX), in which WMO is the implementing organization, UNEP assisted in the establishment and operation of the International Experimental Centre (IEC) in Tokyo. In 1981 IEC carried out a pre-experiment on how early warning systems are working in various South East Asian countries affected by tropical cyclones.

As a continuation of the 1980 Expert Meeting on the Impact of Man's Activities on the Risk of Natural Disasters, UNEP has prepared *Interim Guidelines for Planning and Decision-making to Manage the Risk of Natural Disasters.* The dissemination of the document to Governments and other relevant organizations will take place in 1982.

UNEP has assisted the United Nations Relief Organization (UNDRO) to continue the preparation of a series of monographs on disaster prevention and mitigation. So far nine volumes concerning seismological, volcanological, meteorological, hydrological, land use, economical, legal and civil engineering aspects as well as public information have been published. Further volumes are planned.

**PROJECTS — 1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| • Study of the State of the Art in Disaster Prevention and Mitigation (Phase III) | 5,524.92 |
| • Improvement of Tropical Cyclone Warnings Including Storm Surge Alerts | 815.00 |
| • Early Warning System for Typhoons | 25,00.00* |

* Commitments

# Energy

IN 1981, the Energy Task Force produced a book entitled *The Environmental Impacts of Production and Use of Energy.*

The proceedings of the UNEP/Beijer Institute/USSR International Workshop on the environmental implications of expanded coal utilization (*Moscow, October 1980*) have been finalized and are being published in book form.

The Task Force is continuing its work on the comparative assessment of the environmental impacts of different sources of energy, and work has started on an evaluation of the environmental costs and benefits of different energy systems within the framework of this study.

In the area of renewable sources of energy, several studies were prepared for the United Nations Conference on New and Renewable Sources of Energy, convened in Nairobi, 10-21 August 1981. The following publications were issued:

- *Renewable Sources of Energy: The Environmental Dimension;*
- *Energy for Rural Development: A Time to Act;* and
- Special issue of Mazingira on energy, environment and development.

In addition, UNEP supported the distribution of a publication prepared by Sierra Club International Earthcare Center, *Global Energy in Transition,* and the book *Renewable Sources of Energy and the Environment,* edited by E. El-Hinnawi and A.K. Biswas.

Within the INFOTERRA framework, UNEP issued a *Directory of Sources of Renewable Sources of Energy.*

In co-operation with ESCAP and FAO, an Expert Group Meeting was convened in Bangkok, 5-11 May 1981, to discuss the problems pertaining to fuelwood and charcoal in the ESCAP region. The report of the meeting was circulated at the UN Conference on New and Renewable Sources of Energy and at the eighth session of the Committee on Natural Resources (*Bangkok, 27 October— 2 November 1981*). The report emphasized the need for detailed environmental impact assessment and management of forest resources and outlined a number of priority areas for action.

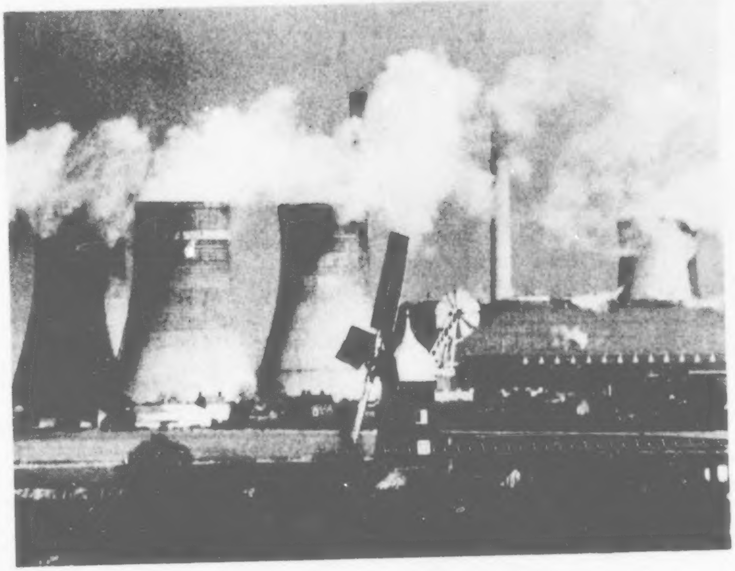
UNEP has also supported the UNITAR International Conference on Small Energy Sources convened in Los Angeles, 9-10 September 1981.

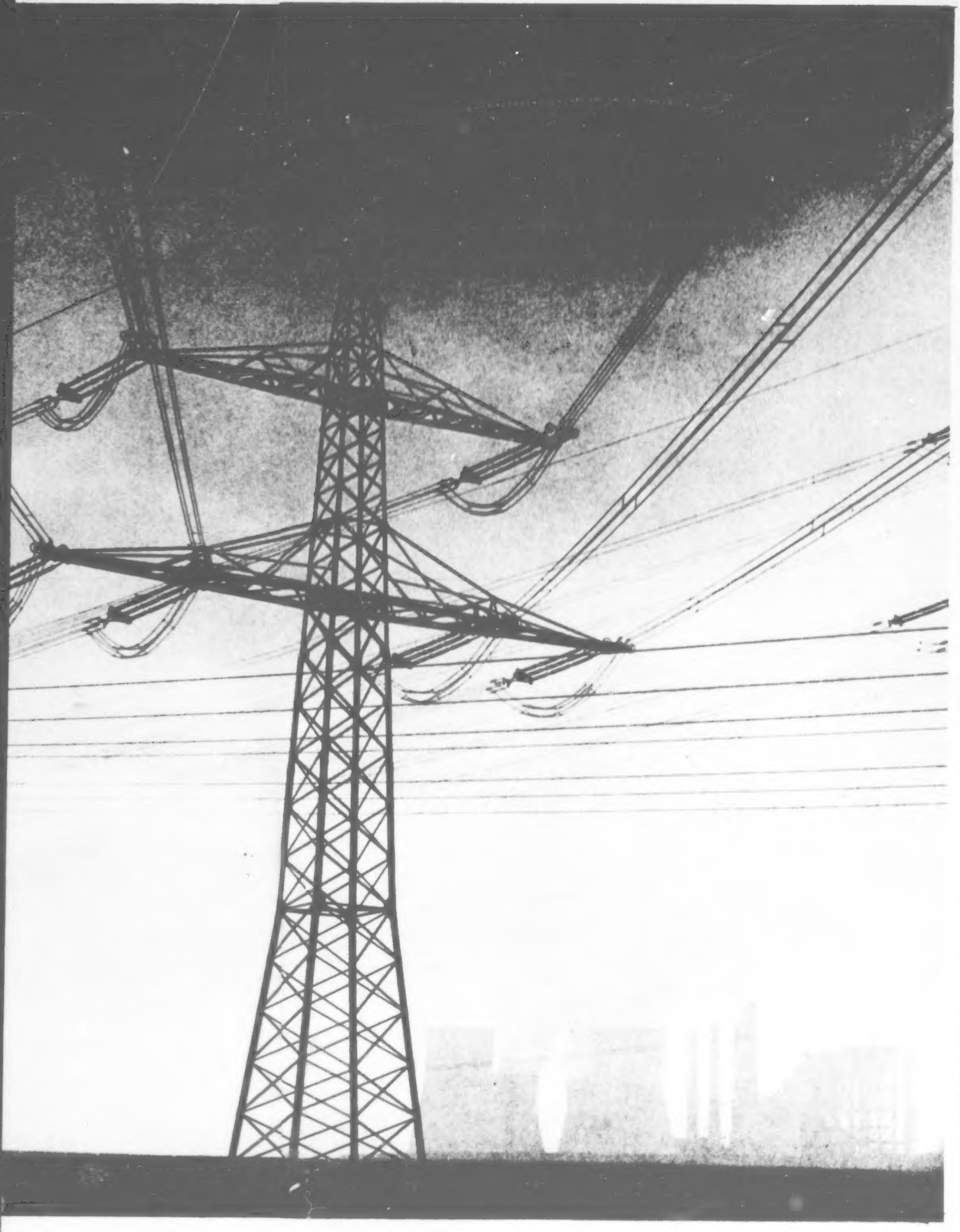
A final evaluation of the experimental rural energy centre in Sri Lanka and the experiments in the Philippines is being undertaken. Technical reports on the projects will be issued and the facilities handed over to the corresponding Governments.

**PROJECTS — 1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| The Feasibility of Harnessing Renewable Sources of Energy in the Philippines | 67,632.04* |
| The Feasibility of Harnessing Renewable Sources of Energy in the Arab Region | 6,668.16* |
| In-depth Study of the Environmental Impacts of Renewable Sources of Energy | 40,427.01 |
| Establishment of an Experimental Rural Energy Centre in Senegal | 1,929.02 |
| Comparative Assessment of the Environmental Impacts of All Sources of Energy | 24,801.65 |
| Energy Supply/Demand and Patterns of Consumption in Rural Areas of Developing Countries | 2,246.73 |
| International Workshop on Environmental Implications and Strategies for Expanded Coal Utilization | 3,197.58 |
| The Feasibility of Harnessing Renewable Sources of Energy in Rural Areas of Indonesia | 46,500.00* |
| The Feasibility of Harnessing Renewable Sources of Energy in Rural Areas of Somalia | 48,000.00* |

* Commitments





# Environmental Education and Training

ENVIRONMENTAL Education and Training continued to serve in 1981 as a principal vehicle through which UNEP attempts to sharpen people's perception and to impart awareness about the problems associated with the environment and the need for its sound management. In 1981 the Environmental Education and Training Unit (EETU) made its contribution to several activities in which intellectual, professional and, in certain cases, financial inputs were made.

In summary, the following are the EETU activities over the year in collaboration with various institutions:

### Workshops/conferences/seminars

- National Training Workshops for Key Educational Personnel:
  - Kingston, Jamaica (March);
  - Kiev, USSR (April);
  - Georgetown, Guyana (May);
  - Sierra Leone and Salgotarjan, Hungary (December)
- Regional Conference on Environmental Education Transfers in ASEAN universities — at Serdang, Malaysia (August), in co-operation with University of Pertanian of Malaysia;
- International Conference on Environmental Education — at Vigyan Bhawan, New Delhi (December), in co-operation with Indian Environmental Society and Department of Environment.

### Environmental education

Research and experimental projects included:

- System and Methods of Environmental Education through Science and Vocational Education at at Secondary School Level (Czechoslovakia);
- Survey on Curriculum Development on Environmental Education at School Level (Federal Republic of Germany);
- Interdisciplinary content and methods in school biology and geography of environmental education (Poland);
- Interdisciplinary forms and methods of environmental education in general polytechnical schools (Bulgaria);
- Comparative survey of system and methods to incorporate environmental education in pre- and in-service teacher training (Cameroon, USSR, India, Chili, Australia, Kuwait);
- Content and Methods of teacher training in environment education (Australia);
- Environmental Pilot Project on Problems of Tropical Rain Ecozones (Costa Rica);
- Environmental Education Project on Desertification (Upper Volta);
- Environmental Pilot Project on Urban Marginal Areas (India);
- Pilot Project on Environmental Problems for General Environmental Education (Cuba).

*Publications included:* (i) a Teachers Guide on Environmental Education; (ii) a Glossary of Terms; (iii) a Sourcebook for Formal Environmental Education; (iv) an International Directory of Institutions Active in the Field of Environmental Education, Revised and Enlarged Edition, 1981; (v) an Annotated Bibliography; (vi) Five Teacher Training Modules; (vii) Three Modules for Primary and Secondary Education on Principal Problems, Conservation and Use of Natural Resources and Desertification; (viii) Guide on the Use of Modular Approaches for Environmental Education; and (ix) Guide on the Use of Gaming and Simulation in Environmental Education.

### Environmental training

Among activities in this area in 1981:

- Introduction of an environmental training component within ILO management development programme, 1981;
- Continued support to the International Centre for Environmental Sciences Education and Training for Spanish-speaking Countries (CIFCA, Madrid), under new institutional framework.
- The Pollution Prevention and Abatement Training Course at the Alexandria Maritime Academy was concluded in the year with production of teaching aids including audio-visual aids.
- Conclusion of *FP/0306-79-01* — International Programme for Training in Environmental Management (IPEME) with material support.

| **PROJECTS — 1981** | **Cost to UNEP (US dollars)** |
|---|---|
| • Staff training and teaching aids for the Alexandria Maritime Transport Academy | 21,820.00 |
| • Establishment of a Programme Activity Centre for Environmental Education and Training in Africa | 43,125.16 |
| • Support to the International Centre for Environmental Sciences Education and Training for Spanish Speaking Countries, Madrid, Phase II | 38,640.31 |
| • International Programme in Environmental Education (Second Phase) | 298,375.92 |
| • Preparation of Environmental Education Curriculum Materials for Elementary and Secondary Schools | 22,478.05 |
| • Environmental Education, Training and Research for Adult Education | 9,036.39 |
| • Promoting an Understanding of Conservation Through Information, Education and Training | 63,277.00 |
| • Introduction of an Environmental Training Component Within ILO Management Development Programmes | 70,534.00 |
| • International Training Programme on Environmental Management (Italy) | 13,462.00 |

# Environmental Data

THE acquisition of environmental data is obviously an important component of policy-making and environmental management. The problem is that these data are usually widely dispersed in various institutions with responsibilities for decision-making in specific environmental areas. Thus the concern for UNEP is to initiate and support data collection and to co-ordinate access to environmental data within the United Nations system as a whole.

The specialized agencies collect, process, use and disseminate data related to their particular fields. But in many cases, valuable information with environmental dimensions is buried in the bulk of data bases established by these agencies and are unknown to potential users. At the same time, there is a lack of co-ordinating machinery to improve the consistency and comparability of information compiled throughout the UN system.

At the national level, various governmental and non-governmental organizations compile and use environmental data, largely in an *ad hoc* manner, unaware of similar activities elsewhere in the country and unaware of the use of these same data in other aspects of the environment. There is therefore an urgent need for Governments to identify their environmental problems and to organize the collection of environmental data systematically. For this purpose, the United Nations Statistical Office, supported by UNEP, has sponsored several workshops to assist Governments in developing their statistical programme in the field of the environment.

**Specific activities in 1981**

- A *Survery of Environmental Statistics: Framework, Approaches and Statistical Publications* has been published through a joint UNCO/UNEP project. It was presented to a number of regional workshops for discussion and revised by them. The survey summarizes the experience of national and international bodies in the development of environmental statistics.
- Technical reports on human settlements, energy, natural resources, land and pollution have been drafted. Following discussions in regional workshops, these reports will be revised and published. They provide information to assist Governments in formulating their environmental statistics programme.
- Pilot projects in Fiji and Kenya have been carried out to test the feasibility of the concepts outlines in the above reports.

**NGO activities in areas of environmental concern**

The Environment Liaison Centre, Nairobi, with UNEP support, has published a series of reports which review NGO activities in selected environmental fields — renewable energy, water and climate change. The reports also mention recent developments in these areas.

**Conferences and meetings**

- UNSO/ESCAP Asian Workshop on Environment Statistics, Pattaya, Thailand, 10-16 February.
- The 15th Session of the ACC Sub-Committee on Statistical Activities, Washington, D.C. 27 April — 1 May.
- Meeting on Lay Reporting of Environment Health Information for Anglophone Africa, Nairobi, 7-11 September.
- Ninth Session of International Statistical Programmes, Geneva, 29 September — 2 October 1981.

| | |
|---|---|
| • The State of the Environment Ten Years After Stockholm ....... | 376,970.19 |
| • Statistics of the Environment ........ | 240,454.89 |
| • The State of the Global Environment: A Decade after Stockholm — A Popular Book ........ | 20,313.93 |

# Information

The Ecology and Utilization of African Inland Waters
uniterra
uniterra
INTO THE SECOND DECADE
AN ENVIRONMENTAL BIBLIOGRAPHY
BIOGAS FERTILIZER SYSTEM
OZONE LAYER
DESERTIFICATION CONTROL

THE work of the Information Service in 1981 was concentrated on planning and, in October, on launching a programme of activities ahead of the Stockholm anniversary year and the Governing Council session of a special character (SSC).

The objective, basically, was to heighten public awareness in all regions of the purpose of the session and of the environmental issues and concerns which would be put forward for debate by UN-Member governments, sister organizations and NGOs.

There were three main elements in this "1982 Information Support Programme"—a range of catalytic activities; a media campaign; and a limited number of special publications.

(a) **Catalytic activity**

Governments were asked to contribute directly to the programme by providing publications and audio-visuals for exhibition and dissemination by the Service, including documentary films, fine art, posters, photographs, environmental cartoons, etc.

They were requested to originate media information, publish or otherwise multiply and distribute material derived from the programme such as news release, feature articles, Press briefings and summaries of UNEP's main "retrospective and perspective" documentation for the SSC.

The Service tested the feasibility of several ideas for component projects of the public awareness campaign, including a self-financing televised concert for the environment and an educational project, "For Every Child a Tree". Initial support was received from a number of governments and the tree-planting project, in particular, gathered momentum as national programmes were planned either by governments individually or in bilateral arrangements between donor and developing countries.

Governments were also encouraged to undertake independent national programmes in the months before the Stockholm commemoration and, in some instances, special inter-ministerial "Environment-82" committees were set up.

Another major area for catalytic activity was the UN system as a whole, with either direct approaches to main co-operating organizations or through a task force of the Joint United nations Information Committee (JUNIC). The Division of Public Information (DPI/DESI) at UN headquarters undertook a number of support activities working with the HQ-accredited NGOs and its network of UN Information Centres (UNICs) in 54 countries.

Other organizations provided the Service with access to their information distribution systems and media, including "house" journals. UNESCO's "Man and the Biosphere" (MAB) programme contributed a standing exhibition and other sister organizations prepared material for a "UN family" exhibition on the environment for simultaneous display at four UN centres in 1982.

The third main thrust of the catalytic effort was with universities, industrial and commercial concerns and more than 2,000 environmental NGOs which were approached for support either directly or through the Environment Liaison Centre (ELC) in Nairobi and other NGO co-ordinating groups in New York and Geneva.

Additional financial assistance was provided to IIED/Earthscan for a seminar and an independent media briefing document on the SSC; and to the ELC for co-ordinating NGO activities in all regions and preparing a regionally representative symposium at the time of the SSC. Planning meetings for the symposium were held during the August UN energy conference in Nairobi and again in November.

(b) **Media campaign**

This was preceded by a survey of general and specialist print media, radio and television stations in all regions and launched with an extensive mailing of SSC briefing materials, news and feature releases. Press kits were prepared and groups of journalists further briefed by the Executive Director on missions, UNEP officers at headquarters, the Regional Directors and Regional Information Officers. Commissioned features were produced for UN and other media, including the *World Newspaper Supplement*. The Service, in turn, invited or commissioned contributions from specialist writers for pre-SSC issues of "Uniterra" and for general release.

(c) **Special Publications**

The Service was involved, to a varying degree, in the production or financing of a number of publications which together would provide substantive background material for the SSC.

These included an in-depth, comprehensive technical report on *The World Environment, 1972-82;* the contributions of heads of state and leading environmentalists in a volume entitled *Voices in Defence of the Earth* and two anthologies of UNEP workd published over the last ten years—*Development Without Destruction* and *Global Environment Issues.*

Production was started on two publications targeted at a more general audience—*People on Earth* by David Munro and *Down to Earth,* a UNEP-supported project of the International Institute for Environment and Development (IIED) by the late Barbara Ward and Eric Eckholm. A special issue of *Mazingira* magazine was also planned.

**Other specific activities in 1981:**

*Audio-Visual*

(a) *Films—production completed or in process:*

- *The Fragile Mountain:* A PBS production as a special for the NOVA series, with UNEP contribution;
- *On the Edge of Paradise:* co-production with BBC on the Caribbean environment;
- *OK Here—Forbidden Anywhere Else:* co-production with an independent US producer, based on the book, *Circle of Poison* and scheduled for PBS broadcast;
- *Refugee:* co-produced with DPI/RUS in New York on the living environments of refugees in Africa;
- *Journey for Survival:* a UNICEF film on water, for which UNEP provided footage;
- *Water—More Precious than Oil:* —UNEP contributions to a KTCA/PBS 50 minute special scheduled for US nation-wide broadcast in 1982;
- *Homo Sapiens:* produced for UNEP by Czechoslovakia's Krathy Film;
- *Environment in Africa:* 100 co-produced with the Dutch Radio Nederland TV for the SSC '82;
- An MTV (Hungarian) feature production on environmental protection

(b) *Radio and Television:* A start was made on building a distribution network of radio and television stations around the world. Interviews with the Executive Director on sound and video tape were distributed together with information kits on the SSC.

(c) *Slide and video presentations:* For exhibition during the UN Energy Conference in Nairobi video programmes were made of:

- *The Water Hyacinth:* slide show, demonstrating how a major environmental pest may be turned into a useful resource;
- *The Biogas in China:* slide show, demonstrating Chinese technologies for the production of biogas energy;
- *The film Firewood:* showing the devastating efforts of people's need for fuelwood in the hills of Northern India and the Himalayas.

(d) *Exhibition:* A black and white photo display on *Biogas in China* was erected during the Energy Conference, together with a display of UNEP publications;

(e) *Photographs:* The Service's photo-library was expanded considerably during the year, principally by contributions for sister UN organizations.

# Information

**Publications**

- English and other language versions of regular publications of the Service, including *Uniterra* and the *UNEP Annual Review*, were written, edited, designed and prepared to final art by the staff of the Support for Publications Project and its Production Unit.

Other regular bulletins and substantive publications of the Programme were also serviced by the project staff:

- A consultant project for the development of a common UNEP design style and graphic standards was established with the sponsorship of the Norwegian Government;
- additional capacity for multi-language production was achieved with the inception of a "Publications and Information Support Programme in the USSR";
- a similar project for publications and information support in the People's Republic of China was held in abeyance;
- interim arrangements for the production and distribution of *Mazingira* were confirmed in an initial two-year contract with a new publisher, Tycooly International of Dublin.

**Other publications issued or in production in 1981 included:**

(a) *UNEP Reports and Proceedings Series:*

- *a training manual on Biogas in China* (E) Vol.2 *(Biogas Fertilizer Cycles)*
- *the Ecology and Utilization of African Inland Waters* (E) Vol.1

(b) *UNEP Reference Series:*
- *An Environmental Bibliography* (E) Vol.2

(c) *UNEP Studies Series:*
- *Environment and Development in Africa* (E) Vol.2
- *The Child in the African Environment* (E) Vol.3

(d) *UNEP Executive Series:*
- *Choosing the Options* (English and Russian);
- *In Defence of the Earth: The Basic Texts* (English and Russian);
- *Technology, Development and the Environment* (Russian);
- *The Economics of Survival* Vol.4;
- *Evaluating the Environment Vol.6;*
- *Analysing the Options* Vol.5;
- *Combatting Desertification* (Russian, French and English);
- *The State of the Environment, 1980: Selected Topics* (English/French);
- *The State of the Environment 1981; Selected Topics* (English/French/Spanish);
- *UNEP Annual Review, 1980* (French and Spanish).

**Press and Public Affairs activities**

- The regular World Environment Day pack of illustrated features based on UNEP's 1981 State of the Environment Report was produced under contract, distributed with the assistance of the Regional Information Officers and adapted in several language editions by media leverage centres.
- Special media services were undertaken in support of the UN energy conference and GCIX, which received wide coverage in particular through the Visnes television news service, the BBC and Swedish broadcasting stations.

**NGO information activities**

- The Service was assigned to expand co-operation with NGOs in 1981, principally through the ELC as a main channel for UNEP information to above 6,500 environmental NGOs round the world. The ELC allocated space regularly in its bimonthly newsletter, produced as an expanded "resource pack" for World Environment Day, and sponsored additional information production by NGOs in Africa and developing countries in other regions.
- The Service maintained its support media production by the Worldwatch Institute; the United Nations Association of the United States and its regular *World Environment Report* publication; and IIED/Earthscan which produced a range of Press briefing documents and features on environmental topics.

**PROJECTS—1981**

| | **Cost to UNEP (US dollars)** |
|---|---|
| • Support for Publications Programme | 549,431.41 |
| • UNEP Sponsored Journal | 178,147.17 |
| • Audio-Visual Support Unit | 133,949.55 |
| • Global Public Education Programme on Environmental Issues | 1,849.23 |
| • Hungarian TV (MTV) Film Series on Environmental Protection | 39,279.17* |
| • Regional Information Support Programme—Regional Office for Africa | 65,506.28 |
| • Regional Information Support Programme—Regional Office for Asia and the Pacific | 97,905.16 |
| • Regional Information Support Programme—Regional Office for Latin America | 18,605.00 |
| • Regional Information Support Programme—Regional Office for West Asia | 70,252.84 |
| • Regional Information Support Programme—Headquarters Support, Nairobi | 181,929.00 |
| • Regional Information Support Programme—Geneva Liaison Office | 143,215.73 |
| • Regional Information Support Programme—New York Liaison Office | 88,167.28 |
| • Publication Programme in the USSR | 38,444.78 |
| • IIED Thematic Media Information Programme (Earthscan: Phase III) | 105,620.00 |
| • Establishment of a Centre for World Environment Information | 5,000.00* |
| • Multimedia Presentation on Environment and Development | 49,938.57 |
| • NGO Participation in Increasing the Information Flow Regarding UNEP Priority Areas | 52,323.00 |
| • Publications and Information Support Programme in the USSR | 21,343.57 |

# The Environment Fund

Contributions to the Environment Fund in respect of 1981 are expected in the end to reach a total of $30.9 million, of which $30.2 million had been paid by the end of May 1982. In the medium term plan period 1978-1981, it is now estimated that the total of contributions will reach a level of $124.5 million: $123.2 million had been paid by the end of May 1982 and only $1.2 million was still outstanding.

Some contributions continued to be paid in non-convertible currencies in 1981 but that year was the second in which these currencies were used at a level higher than the level of new contributions in the year.

A more difficult problem arose from the tendency of Governments to pay their contributions to the Environment Fund later in the year than they had in earlier years. This meant that the flow of resources to the Fund, apart from being delayed, was less predictable and new commitments against those resources had to be entered into with caution.

As a result of this situation, the overall level of commitments for Fund programme activities as at the end of December 1981 was lower at $30.8 million than it has been at the same date in the previous year, $32.1 million. This in turn meant that expenditures on Fund programme activities in 1981 was lower at $23.2 million than it had been in 1980, $26.8 million. This level of expenditure was lower than had been estimated and as a result the overall balance of the Environment Fund as at 31 December 1981 and carried into 1982 was at $24.6 million higher than had been expected earlier.

Six trust funds are now administered by the Fund of UNEP. These are:

1. Kuwait
2. Med
3. CITES
4. West and Central Africa
5. Caribbean
6. East Asia

A total of $9.97 million was pledged by governments for the Kuwait, Med and CITES Trust Funds (as at 31 December 1981). The West and Central Africa, Caribbean and East Asia Trust Funds were established in January 1982.

The following tables indicate the status of resources, the appropriations, allocations, commitments and expenditures in 1981, the institutional and geographical distribution of projects, the distribution of expenditures by budget lines and the projects approved by the Fund in 1981.

**Annex**

**Table 1**
*Estimates of resources— Status as at 31 December 1981.*

a) Fund of the United Nations Environment Programme
b) Regional Trust Fund for the Protection of the Mediterranean Sea Against Pollution
c) Regional Trust Fund for the Protection and Development of the Marine Environment and Coastal Areas of Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates
d) Trust Fund for the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES)

**Table 2**
*Appropriation, allocations, commitments and expenditures in 1981*

**Table 3**
*Institutional distribution of commitments and expenditures in 1981*

**Table 4**
*Geographical distribution of programme activities by year (percentages)*

**Table 5**
*Distribution of expenditures 1973-1981 by budget lines*

**Table 6**
*Projects approved by the Fund in 1981*

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# Table 1

## Estimate of Resources (1978-1981)

**(in US dollars equivalent)**

## Status as at 30 April 1981

- * Pledges announced in currencies other than US dollars
- ** Pledges made partially in Non Convertible Curroncies (NCC)
- *** NCC contributions

| Country | Pledge 1973-1977 | Pledge 1978-1981 | Years | Estimated 1978-1981 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|
| Afghanistan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Albania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Argeria | 10,000 | 39,995 | 3 | 39,995 | 9,995 | 10,000 | 10,000 | 10,000 |
| Angola | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Argentina | 160,000 | 260,000 | 4 | 260,000 | 60,000 | 60,000 | 70,000 | 70,000 |
| Australia | 2,500,000 | 2,000,000 | 4 | 2,000,000 | 500,000 | 500,000 | 500,000 | 500,000 |
| Austria | 800,000 | 1,100,000 | 4 | 1,100,000 | 200,000 | 300,000 | 300,000 | 300,000 |
| Bahamas | 0 | 2,000 | 4 | 2,000 | 500 | 500 | 500 | 500 |
| Bahrain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bangladesh*** | 2,000 | 17,000 | 4 | 17,000 | 2,000 | 5,000 | 5,000 | 5,000 |
| Barbados | 0 | 1,000 | 1 | 3,000 | 0 | 1,000 | 1,000 | 1,000 |
| Belgium | 1,250,000 | 900,000 | 3 | 1,200,000 | 300,000 | 300,000 | 300,000 | 300,000 |
| Benin* | 945 | 8,000 | 4 | 7,549 | 2,000 | 2,000 | 2,000 | +2,000 |
| Bhutan | 0 | 1,000 | 1 | 3,000 | 0 | 1,000 | 1,000 | 1,000 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Botswana* | 6,440 | 3,883 | 3 | 3,883 | 0 | 1,266 | 1,280 | 1,337 |
| Brazil | 80,000 | 80,000 | 4 | 80,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Bulgaria*** | 2,058 | 18,481 | 4 | 18,481 | 1,029 | 5,714 | 5,869 | 5,869 |
| Burma | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Burundi | 2,195 | 8,880 | 4 | 8,880 | 1,097 | 1,097 | 1,097 | 5.589 |
| Byelorussian SSR*** | 53,302 | 76,486 | 4 | 76,486 | 18,845 | 19,549 | 19,757 | 18,335 |
| Canada | 5,000,000 | 3,505,000 | 4 | 3,505,000 | 1,000,000 | 1,000,000 | 700,000 | 805,000 |
| Cape Verde | 0 | 2,000 | 1 | 2,000 | 2,000 | 0 | 0 | 0 |
| Central African Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chad | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chile | 7,000 | 14,000 | 4 | 14,000 | 3,000 | 3,000 | 3,000 | 5,000 |
| China*** | 425,369 | 448,112 | 2 | 448,112 | 0 | 333,333 | 0 | 114,779 |
| Columbia | 9,057 | 60,001 | 4 | 60,001 | 5,000 | 5,000 | 21,395 | 28,606 |
| Comoros | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Congo | 0 | 14,428 | 2 | 14,428 | 0 | 0 | 5,904 | 8,524 |
| Costa Rica | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cuba*** | 49,080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

a. Estimates of future resources do not imply an undertaking of any kind on the part of countries and do not prejudge constitutional processes with respect to future contributions.

b. Number of years covered by 1978-1981 pledge

- * Pledges specified partly in non-convertible currencies other than US dollars
- ** Pledges specified partly in non-convertible currencies and partly in convertible currencies
- *** Pledges specified wholly in non-convertible currencies
- + Revised estimate for 1981 taking into account change in value of US dollar in terms of contributions paid in local curroncies.

## Table 1

| Country | Pledge 1973-1977 | Pledge 1978-1981 | Years | Estimated 1978-1981 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|
| Cyprus | 2,000 | 8,000 | 4 | 8,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Czechoslovakia*** | 105,636 | 108,987 | 4 | 108,987 | 28,195 | 28,736 | 26,930 | 25,126 |
| Democratic Kampuchea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Democratic People's Republic of Korea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Democratic Yemen | 0 | 5,102 | 4 | 5,102 | 1,000 | 1,000 | 1,323 | 1,456 |
| Denmark | 1,360,000 | 1,535,032 | 4 | 1,535,032 | 400,000 | 400,000 | 400,000 | 335,032 |
| Djibouti | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dominica | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dominican Repupblic | 0 | 4,000 | 4 | 4,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Equador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Egypt | 30,000 | 39,606 | 4 | 39,606 | 9,795 | 9,957 | 10,000 | 9,854 |
| El Salvador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Equatorial Guinea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ethiopia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fiji | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Finland | 900,000 | 1,163,265 | 4 | 1 163.265 | 200,000 | 313,265 | 300,000 | 350,000 |
| France* | 6,537,407 | 5,555,029 | 4 | 5,555,029 | 1,290,323 | 1,764,706 | 1,428,571 | 1,071,429 |
| Gabon | 0 | 1,034 | 1 | 4,136 | 1,034 | 1,034 | 1,034 | 1,034 |
| Gambia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| German Democratic Republic** | 324,526 | 683,926 | 4 | 683,926 | 91,721 | 198,424 | 214,127 | 179,654 |
| Germany, Federal Republic of* | 8,130,597 | 9 118.164 | 4 | 9,118.164 | 2,265,367 | 2,500,600 | 2,395,675 | 1,956,522 |
| Ghana | 70,146 | 34.800 | 4 | 34,800 | 8,700 | 8,700 | 8,700 | 8,700 |
| Greece | 19,993 | 33,599 | 4 | 33,599 | 6,992 | 8,869 | 8,869 | 8,869 |
| Grenada | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guatemala | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guinea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guinea Bissau | 0 | 8,000 | 4 | 8,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Guyana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Haiti | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Holy See | o | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Honduras | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hungary*** | 91,535 | 98.447 | 4 | 98,447 | 25,668 | 28,137 | 24,618 | 20,024 |
| Iceland | 19,000 | 24,100 | 4 | 24,100 | 5,500 | 6,000 | 6,000 | 6,000 |
| India** | 492,077 | 301,273 | 3 | 401,273 | 100,000 | 100,062 | 101,211 | 100,000 |
| Indonesia | 48,000 | 36,000 | 4 | 48,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| Iran | 260,000 | 400,000 | 4 | 400,000 | 100,000 | 100,000 | 100,000 | 100,000 |
| Iraq | 118,636 | 301,570 | 4 | 301,570 | 75,013 | 74,703 | 75,583 | 76,271 |
| Ireland* | 35,001 | 97,515 | 4 | 97,515 | 24,012 | 25,845 | 26,923 | 20,735 |
| Israel | 10,000 | 25,000 | 2 | 55,000 | 10,000 | 15,000 | 15,000 | 15,000 |
| Italy | 1,600,000 | 400,000 | 4 | 1,600,000 | 400,000 | 400,000 | 400,000 | 400,000 |
| Ivory Coast | 1,976 | 45,675 | 1 | 45,675 | 0 | 0 | 0 | 45,675 |
| Jamaica | 14,000 | 15,745 | 4 | 15.745 | 4,000 | 4,000 | 4,000 | 3,745 |
| Japan | 10,000,000 | 13,919,660 | 4 | 13,919,660 | 3,000,000 | 3,319,660 | 3,600,000 | 4.000,000 |

## Table 1

| Country | Pledge 1973-1977 | Pledge 1978-1981 | Years | Estimated 1978-1981 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|
| Jordan | 1,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kenya | 150,597 | 175,609 | 4 | 175,609 | 44,565 | 45,998 | 45,046 | 40,000 |
| Kuwait | 133,300 | 550,000 | 4 | 550,000 | 50,000 | 100,000 | 200,000 | 200,000 |
| Lao People's Democratic Republic | 0 | 8,000 | 3 | 8,000 | 0 | 4,000 | 2,000 | 2.000 |
| Lebanon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lesotho | 3,000 | 1,000 | 1 | 4,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Liberia | 6,000 | 3,000 | 2 | 4,500 | 0 | 1,500 | 1.500 | 1,500 |
| Libyan Arab Jamahiriya | 300,000 | 300,000 | 3 | 300,000 | 100,000 | 0 | 100,000 | 100,000 |
| Liechtenstein | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Luxembourg* | 41,036 | 43,258 | 4 | 43,258 | 13,258 | 10,000 | 10,000 | 10,000 |
| Madagascar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Malawi | 2,163 | 9,587 | 4 | 9,587 | 2,305 | 2,439 | 2,439 | 2,404 |
| Malaysia | 0 | 40,000 | 4 | 40,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Maldives | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mali | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Malta* | 6,993 | 7,634 | 4 | 7,634 | 1,792 | 1,980 | 2,020 | 1,842 |
| Mauritania | 0 | 4,040 | 1 | 8,080 | 0 | 0 | 4,040 | 4,040 |
| Mauritius* | 0 | 3,003 | 3 | 3,908 | 1,006 | 1,000 | 998 | + 094 |
| Mexico | 900,000 | 500,000 | 4 | 500,000 | 100,000 | 100,000 | 150,000 | 150,000 |
| Monaco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mongolia | [illegible] | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morocco | 50,000 | 10,276 | 2 | 10,276 | 0 | 5,138 | 5,138 | 0 |
| Mozambique | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nauru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nepal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands* | 1,500,000 | 1,593,896 | 4 | 1,593,869 | 330,000 | 416,913 | 456,972 | 456,971 |
| New Zealand* | 328,338 | 338,572 | 4 | 338,572 | 83,137 | 87,110 | 80,287 | 88,038 |
| Nicaragua | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Niger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nigeria | 124,000 | 128,000 | 1 | 128,000 | 32,000 | 32,000 | 32,000 | 32,000 |
| Norway* | 2,207,786 | 3,368,397 | 4 | 3,368,397 | 556,328 | 804,085 | 1,021,673 | 986,311 |
| Oman | 2,895 | 9,999 | 3 | 9,999 | 0 | 3,333 | 3,333 | 3,333 |
| Pakistan | 10,000 | 15,000 | 3 | 20,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Panama* | 0 | 12,000 | 4 | 12,000 | 0 | 4,000 | 4,000 | 4,000 |
| Papua New Guinea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 7,000 | 8,000 | 4 | 8,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Philippines | 40,000 | 60,000 | 4 | 60,000 | 12,000 | 14,000 | 16,000 | 18,000 |
| Poland*** | 200,804 | 185,744 | 4 | 185,744 | 50,201 | 45,181 | 45,181 | 45,181 |
| Portugal | 9,000 | 8.000 | 4 | 12,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Quartar | 10,000 | 30.000 | 3 | 30,000 | 0 | 10,000 | 10,000 | 10,000 |
| Republic of Korea | 0 | 40,000 | 4 | 40,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Romania*** | 20,835 | 20,455 | 4 | 20,455 | 5,000 | 5,000 | 5,000 | + 5,455 |
| Rwanda | 2,133 | 2,132 | 1 | 2,132 | 2,132 | 0 | 0 | 0 |
| Saint Lucia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Table 1

| Country | Pledge 1973-1977 | Pledge 1978-1981 | Years | Estimated 1978-1981 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|
| Samoa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| San Marino | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sao Tome and Principe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saudi Arabia | 15,000 | 1,000,000 | 4 | 1,000,000 | 250,000 | 250,000 | 250,000 | 250,000 |
| Senegal | 2,120 | 10,000 | 2 | 20,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Seychelles | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sierra Leone | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Singapore | 5,000 | 4,000 | 4 | 4,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Solomon Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Somalia | 0 | 4,815 | 3 | 4,815 | 0 | 1,605 | 1,605 | 1,605 |
| South AFrica | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spain | 1,000,000 | 800,000 | 4 | 800,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| Sri Lanka | 1,500 | 3,500 | 4 | 3,500 | 500 | 500 | 500 | 2,000 |
| Sudan | 5,366 | 6,000 | 4 | 6,000 | 1,500 | 1,500 | 1,500 | 1,500 |
| Suriname | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swaziland | 2,727 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sweden | 5,000,000 | 7,500,000 | 4 | 7,500,000 | 1,875,000 | 1,875,000 | 1,875,000 | 1,875,000 |
| Switzerland* | 1,188,922 | 2,232,932 | 4 | 2,232,932 | 489,476 | 592,242 | 637,707 | 637,707 |
| Syrian Arab Republic | 0 | 3,006 | 3 | 4,006 | 1,000 | 1,000 | 1,006 | 1,000 |
| Thailand | 10,000 | 40,000 | 4 | 40,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Togo* | 0 | 1,807 | 2 | 3,509 | 930 | 930 | 922 | +727 |
| Tonga | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trinidad and Tobago | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tunisia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turkey | 30,000 | 24.000 | 4 | 24,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Uganda | 1,203 | 1,644 | 3 | 1,644 | 1,263 | 127. | 127 | .127 |
| Ukrainian SSR*** | 127,872 | 188,264 | 4 | 188,264 | 46,378 | 48,120 | 48,632 | 45,134 |
| USSR*** | 10,474,888 | 15,425,913 | 4 | 15,425,913 | 3,800,087 | 3,942,857 | 3,984,803 | 3,698,166 |
| United Arab Emirates | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom* | 3,927,880 | 5,015,287 | 4 | 5,015,287 | 1,154,042 | 1,331,757 | 1,428,571 | 1,100,917 |
| United Republic of Cameroon | 0 | 14,670 | 4 | 14,670 | 3,001 | 3,000 | 3,000 | 5,669 |
| United Republic of Tanzania* | 9,625 | 16,174 | 4 | 16,174 | 4,043 | 4,043 | 4,044 | 4,044 |
| United States of America | 30,000,000 | 39,981,000 | 4 | 39,981,000 | 10,000,000 | 10,000,000 | 10,000,000 | 10,000,000 |
| Upper Volta | 0 | 1,000 | 1 | 4,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Uruguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vanatu | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela | 50,000 | 160,000 | 3 | 260,000 | 30,000 | 30,000 | 100,000 | 9,981,000 |
| Vietnam (Socialist Republic of) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yemen Arab Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yugoslavia** | 100,000 | 141,512 | 4 | 141,512 | 35,000 | 35,000 | 35,411 | 36,101 |
| Zaire | 125,000 | 25,000 | 1 | 100,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| Zambia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zimbabwe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 98,655,619 | 123,898,111 |  | 124,497,410 | 29,544,730 | 31,984,838 | 32,002,295 | 30,965,547 |

*On the basis of official communication from the United States Government there will be no further contribution paid until after the General Assembly. Therefore, there must be great uncertainty as to this figure.

## Table 1

## Regional Trust Fund for the Protection of the Mediterranean Sea Against Pollution

(in US dollars)

Status as at 30 June 1981

| Country | 1979-1980 Pledged Contributions | Contributions paid | (Date of last payment) | Contributions outstanding |
|---|---|---|---|---|
| Albania | 2,690 | — | | 2,690 |
| Algeria | 26,920 | 26,920.00 | (10. 1.80) | — |
| Cyprus | 2,690 | 2,690.00 | (14.11.79) | — |
| Egypt | 21,530 | 21,530.00 | (18.12.80) | — |
| France | 1,564,050 | 1,564,050.00 | (16.12.80) | |
| | | | | — |
| Greece | 94,220 | 94,220 | | — |
| Israel | 61,910 | 61,910 | (25.06.80) | |
| | | | | — |
| Italy | 744,610 | 678,336 | (27-02-81) | 66,274 |
| Lebanon | 8,070 | | | 8,070 |
| Libya | 43,070 | 43,070 | (21.10.80) | |
| Malta | 2,690 | 2 690 | (05.12.79) | — |
| Monaco | 2,690 | 2,690 | (06.02.80) | — |
| Morocco | 13,460 | 13,460 | (30-06-80) | |
| | | | | — |
| Spain | 412,200 | 412,000 | ( 6. 6.80) | 200 |
| Syria | 5,380 | 5,380 | (19.11.80) | — |
| Tunisia | 5,380 | 5,380 | (28. 1.80) | — |
| Turkey | 80.760 | 80,760. | (19-06-81) | 63,449.04 |
| Yugoslavia | 107,680 | 22,248 | (13. 2.80) | 85,432 |
| | | 84,580 | (23-07-81) | 852 |
| | 3,200,000 | 3,121,914 | | 78,086 |
| E.E.C. | 80,000 | 80,000.00 | (14.10.80) | |
| | | 21,356.76 | (27. 5.80) | |
| | | 21,356 | (15. 2.80) | |
| | | 3,843.96 | (17. 8.80) | |
| | | 4,264.20 | (22. 9.80) | |
| | | 10,535.08 | (14.10.80) | |
| | | 80,000.00 | | |
| TOTAL | 3,280,000 | 3,201,914 | | 78,086 |

## Table 1

## Regional Trust Fund for the Protection Development of the Marine Environment and Coastal Areas of Bahrain, Iran, Iraq, Kuwait, Oman, Quatar, Saudi Arabia and the United Arab Emirates

**(in US dollars)**

**Status as at 30 June 1981**

| Country | Pledge | 1st Instalment 15 Oct. 1978 | 2nd Instalment 1 April 1979 | 3rd Instalment 1 Dec. 1979 | 4th Instalment 1 Mar. 1980 |
|---|---|---|---|---|---|
| Bahrain | 116,400 | 29,100 | 29,100 | 29,100 | 29,100 |
| Iran | 1,631,928 | 407,982 | 407,982 | 407,982 | 407,982 |
| Iraq | 736,812 | 184,203 | 184,203 | 184,203 | 184,203 |
| Kuwait | 899,772 | 224,943 | 224,943 | 224,943 | 224,943 |
| Oman | 116,400 | 29,100 | 29,100 | 29,100 | 29,100 |
| Qatar | 519,726 | 129,932 | 129,932 | 129,931 | 129,931 |
| Saudi Arabia | 1,116,276 | 279,069 | 279,069 | 279,069 | 279,069 |
| United Arab Emirates | 682,686 | 170,671 | 170,671 | 170,672 | 170,671 |
| Total pledged | 5,819,999 | 1,455,000 | 1,455,000 | 1,455,000 | 1,454,999 |
| Total received | 4,227,647 | 1,455,000 | 1,047,018 | 862,815 | 862,814 |

## First Instalment

## 15 October 1978

| Country | Pledge | Contributions paid (date of payment) | | Contributions outstanding |
|---|---|---|---|---|
| Bahrain | 29,100 | 29,100 | (15. 2.79) | – |
| Iran | 407,982 | 407,982 | (27. 2.79) | – |
| Iraq | 184,203 | | | 184,203 |
| Kuwait | 224,943 | 224,943 | (10.10.78) | |
| Oman | 29,100 | 29,100 | (27.12.78) | – |
| Qatar | 129,932 | 129,932 | ( 5.12.78) | – |
| Saudi Arabia | 279,069 | 279,069 | (31. 1.79) | – |
| United Arab Emirates | 170,071 | 170,671 | (18. 3.80) | – |
| Total | 1,455,000 | 1,270.797 | | 184,203 |

## Table 1

### Second Instalment
### 1 April 1979

| Country | Pledge | Contributions paid (date of payment) | | Contributions outstanding |
|---|---|---|---|---|
| Bahrain | 29,100 | 29,100 | (17. 4.79) | — |
| Iran | 407,982 | | | 407,982 |
| Iraq | 184,203 | | | 184,203 |
| Kuwait | 224,943 | 224,940 | ( 9. 4.79) | — |
| | | 3 | (15. 1.80) | |
| Oman | 29,100 | 29,100 | ( 4. 2.79) | — |
| Qatar | 129,932 | 129,932 | (12. 4.79) | — |
| Saudi Arabia | 279,069 | 274,900 | ( 1. 6.79) | |
| | | 4,169 | (26. 9.79) | — |
| United Arab Emirates | 170,671 | 170,671 | (18. 3.80) | — |
| Total | 1,455,000 | 862,815 | | 592,185 |

### Third Instalment
### 1 December 1979

| Country | Pledge | Contributions paid (date of payment) | | Contributions outstanding |
|---|---|---|---|---|
| Bahrain | 29,100 | 29,100 | (18.11.80) | — |
| Iran | 407,982 | | | 407,982 |
| Iraq | 184,203 | | | 184,203 |
| Kuwait | 224,943 | 224,943 | (26. 3.80) | — |
| Oman | 29,100 | 29,100 | (22. 4.80) | — |
| Qatar | 129,931 | 129,931 | (12. 6.80) | — |
| Saudi Arabia | 279,069 | 279,069 | ( 9. 5.80) | — |
| United Arab Emirates | 170,672 | 170,672 | (16.12.81) | 170,672 |
| Total | 1,455,000 | 862,815 | | 592,185 |

### Fourth Instalment
### 1 December 1980

| Country | Pledge | Contributions paid (Date of payment) | | Contributions outstanding |
|---|---|---|---|---|
| Bahrain | 29,100 | 29,100 | ( 4. 4.80) | — |
| Iran | 407,982 | | | 407,982 |
| Iraq | 184,203 | | | 184,203 |
| Kuwait | 224,943 | 224,943 | (15. 1.80) | — |
| Oman | 29,100 | 29,100 | ( 4. 2.80) | — |
| Qatar | 129,931 | 129,931 | (23. 7.79) | — |
| Saudi Arabia | 279,069 | 279,069 | ( 9. 5.80) | — |
| United Arab Emirates | 170,672 | 170,671 | (16.12.81) | 170,672 |
| Total | 1,455,000 | 862,814 | | 592,185 |

# Table 1

## Trust Fund for the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

(in US dollars)

## Scale of contributions for the biennium 1980-1981

| Country | Pledged Contributions | Contributions paid (date of last payment) | | contributions outstanding |
|---|---|---|---|---|
| Australia | 18,021.84 | 18,021.84 | (23.07.81) | |
| Bahamas | 98.48 | 98.48 | (30.04.80) | – |
| Bolivia | 98.48 | | | 98.48 |
| Botswana | 196.96 | 196.96 | (22.06.81) | – |
| Brazil | 12,506.96 | 12,506.96 | (13.05.81) | |
| Canada | 32,341.00 | 32,341.00 | (06.03.81) | |
| Chile | 690.00 | 690.00 | (10.03.80) | – |
| Costa Rica | 196.96 | | | 196.96 |
| Cyprus | 98.48 | 98.48 | (02.05.80) | – |
| Denmark | 7,287.52 | 7,287.52 | (03.03.81) | |
| Equador | 197.35 | 197.35 | (19.11.80) | – |
| Egypt | 689.36 | 689.36 | (02.11.81) | – |
| Finland | 4,727.04 | 4,727.04 | (16.04.80) | – |
| France | 61,648.48 | 61,648.48 | (17.12.81) | |
| Gambia | 98.48 | | | 98.48 |
| German Democratic Republic | 13,688.72 | | | 13,688.72 |
| German Federal Republic | 81,836.88 | 81,836.88 | (02.02.81) | |
| Ghana | 295.44 | | | 295.44 |
| Guatemala | 196.96 | 196.96 | (15.04.80) | – |
| Guyana | 98.48 | | | 98.48 |
| India | 5,908.80 | 5,908.80 | (29.09.81) | |
| Indonesia | 1,575.68 | 1,575.68 | (13.05.80) | – |
| Iran | 6,401.20 | | | 6.401.20 |
| Israel | 2,642.00 | 2,642.00 | (04.03.81) | – |
| Italy | 33,975.80 | | | 33,975.60 |
| Japan | 92,987.00 | 92,987.00 | (31.12.81) | |
| | | | | – |
| Jordan | 100.00 | 100.00 | (15.05.80) | – |
| Kenya | 98.48 | 98.48 | (17.04.82) | – |
| Liechtenstein | 98.48 | 98.48 | (09.09.81) | |
| Madagascar | 98.48 | 98.48 | (16.06.80) | – |
| Malaysia | 886.32 | | | 886.32 |
| Mauritius | 98.48 | 98.48 | (15.09.80) | – |
| Monaco | 98.48 | 98.48 | (09.09.81) | – |
| Morocco | 492.40 | | | 492.40 |
| Nepal | 98.80 | 98.80 | (30.07.80) | – |
| Nicaragua | 98.48 | 98.48 | (20.11.80) | – |
| Niger | 98.48 | | | 98.48 |
| Nigeria | 1,575.68 | | | 1,575.68 |
| Norway | 4,924.00 | 4,924.00 | (25.03.80) | – |
| Pakistan | 688.68 | 688.68 | (02.07.81) | 345.36 |
| Panama | 197.48 | 197.48 | (26.11.80) | |
| | | | | – |
| Papua New Guinea | 98.48 | 98.48 | (21.12.80) | – |
| Paraguay | 98.45 | 98.45 | (31.12.80) | – |
| Peru | 590.88 | 590.88 | (31.12.80) | – |
| Senegal | 98.48 | | | 98.48 |
| Seychelles | 98.48 | 98.48 | (19.02.80) | – |
| South Africa | 4,136.16 | 4,136.16 | (26.06.81) | |
| Sri Lanka | 196.96 | 196.96 | (19.02.80) | – |
| Sweden | 12,900.88 | 12,900.88 | (28.04.80) | – |
| Switzerland | 10,340.40 | 10,340.40 | (19.03.81) | – |
| Togo | 98.48 | 70.94 | (22.03.81) | 27.54 |
| Tunisia | 295.44 | 295.44 | (31.12.81) | – |
| USSR | 109,312.80 | | | 109,312.80 |
| United Arab Emirates | 984.80 | | | 984.80 |
| United Kingdom | 43,922.08 | 43,922.08 | (30.04.81) | |
| United Republic of Tanzania | 98.48 | 98.48 | (02.12.81) | – |
| United States of America | 238,275.00 | 238,275.00 | (25.05.81) | – |
| Uruguay | 393.92 | 393.92 | (27.01.81) | – |
| Venezuela | 4,924.00 | 4,924.00 | (12.09.80) | – |
| Zaire | 196.96 | 196.96 | (09.09.80) | – |
| Zambia | 98.48 | 98.48 | (10.02.81) | |
| Total | 815,316.48 | 646,986.62 | | 168,329.86 |

## Table 2

### Allocations and Commitments for Fund Programme Activities and their Apportionment by Budget Line in 1979

(thousands of dollars)

| Areas | Appropriation | Allocations | Commitments | Expenditures |
|---|---|---|---|---|
| 01 Human Settlements and Human Health | 5,810 | 5,714 | 3,297 | 2.182 |
| 03 Support | 7,360 | 7,436 | 6,177 | 5,522 |
| 04 Environment and Development | 2,720 | 3,019 | 2,336 | 1,610 |
| 05 Oceans | 4,650 | 4,348 | 3,447 | 2.849 |
| 07 Energy | 1,200 | 1,198 | 546 | 100 |
| 10 Environmental Management | 1,090 | 1,087 | 784 | 388 |
| 11 Terrestrial Ecosystems | 6,750 | 6,549 | 3,852 | 2,650 |
| 12 Natural Disasters | 390 | 441 | 102 | 27 |
| 13 Earthwatch | 6,850 | 7,048 | 6,359 | 4,922 |
| 16 Environmental Data | 690 | 734 | 739 | 663 |
| 17 Arid and Semi-arid Lands (including desertification) | 3,510 | 3,486 | 2,482 | 2,052 |
| Total Fund Programme Activities | 41,020 | 41.060 | 30,301 | 22,965 |
| Total Fund Programme Reserve Activities | 1,000 | 1,000 | 545 | 239 |
| Grand Total | 42,020 | 42,060 | 30,846 | 23,204 |

## Table 3

### Institutional Distribution of Expenditures, Commitments in 1979

| | 1980 | | 1981 | | | |
|---|---|---|---|---|---|---|
| Institution | Expenditures | % | Commitments | % | Expenditures | % |
| Co-operating agencies | 9.26 | 34.6 | 9.90 | 32.1 | 7.1 | 30.6 |
| Supporting organizations | 7.59 | 28.3 | 9.50 | 30.8 | 6.7 | 28.8 |
| Programme Activity Centres | 2.89 | 10.8 | 4.37 | 9.9 | 3.8 | 16.4 |
| Direct Implementation | 7.10 | 26.3 | 7.08 | 27.1 | 5.6 | 24.2 |
| Total | 26.83 | 100.0 | 30.85 | 100.0 | 23.2 | 100.0 |

## Table 4

### Geographical Distribution of Fund Programme Activities by Year (Percentages)

| | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|
| Africa | 17.5 | 12.3 | 9.0 | 7.3 | 7.3 | 10.4 | 9.9 | 11.1 | 9.6 |
| Asia* | 2.2 | 6.5 | 5.7 | 4.5 | 6.4 | 6.6 | 6.8 | 12.6 | 7.9 |
| The Americas (including Caribbean) | — | 12.7 | 3.2 | 2.6 | 3.9 | 5.9 | 8.0 | 5.3 | 8.7 |
| Europe and Mediterranean | .8 | 2.1 | 4.2 | 6.8 | 10.7 | 11.1 | 6.1 | 3.0 | 4.1 |
| Total regional | 21.5 | 33.6 | 22.1 | 23.1 | 28.3 | 34.0 | 30.8 | 32.0 | 30.4 |
| Proyectos mundiales | 78.5 | 62.8 | 74.0 | 73.0 | 65.1 | 59.7 | 63.5 | 56.5 | 58.5 |
| Proyectos interregionales** | — | 3.6 | 3.9 | 3.9 | 6.6 | 6.3 | 5.7 | 11.5 | 11.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Asia includes Western Asia and the Pacific.

**For the years 1974-1979, these figures were included under the global figure in previous documents.

## Table 5

### Redistribution of Expenditures 1973-1978 by 1979 Budget Lines Compared with 1979 Expenditures

$000 Expenditure

| Areas | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|
| 01 Human settlements and human health | 126 | 643 | 4,070 | 2,024 | 1,988 | 2,509 | 3,088 | 2,286 | 2,182 |
| 03 Support | 113 | 1,121 | 2,772 | 3,085 | 5,405 | 4,772 | 5,872 | 5,364 | 5,522 |
| 04 Environment and development | 13 | 578 | 1,388 | 1,148 | 1,611 | 1,342 | 2,221 | 1,681 | 1,610 |
| 05 Oceans | 7 | 176 | 777 | 1,834 | 2,412 | 2,362 | 2,742 | 2,852 | 2,849 |
| 07 Energy | — | 74 | 288 | 364 | 599 | 549 | 279 | 302 | 100 |
| 10 Environmental management including environmental law | — | 72 | 138 | 239 | 421 | 704 | 398 | 413 | 388 |
| 11 Ecosystems | — | 699 | 1,850 | 3,824 | 4,431 | 5,144 | 4,649 | 5,051 | 2,650 |
| 12 Natural disasters | 8 | 117 | 195 | 138 | 103 | 95 | 74 | 59 | 27 |
| 13 Earthwatch including IRPTC | 50 | 357 | 964 | 1,525 | 3,038 | 4,223 | 5,081 | 5,252 | 4,922 |
| 15 UNHHSF | 45 | 129 | 600 | 1,503 | 1,200 | 700 | — | — | |
| 16 Data | — | — | — | — | 17 | 376 | 523 | 466 | 663 |
| 17 Arid and Semi Arid Lands (including Desertification) | — | — | — | — | — | — | 2,109 | 3,063 | 2,052 |
| Total Fund programme acti | 362 | 3,966 | 13,042 | 15,684 | 21,225 | 22,776 | 27,036 | 26,789 | 22,965 |
| Fund programme reserve | — | 49 | 103 | 124 | 46 | 126 | — | 41 | |
| Total activities | 362 | 4,015 | 13,145 | 15,808 | 21,271 | 22,902 | 27,036 | 26,830 | 23,204 |

Percentage of total expenditures

| 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|
| 34.8 | 16.1 | 31.0 | 12.8 | 9.4 | 11.0 | 11.4 | 8.5 | 9.4 |
| 31.2 | 27.9 | 21.1 | 19.5 | 25.4 | 20.8 | 21.7 | 20.0 | 23.8 |
| 3.6 | 14.4 | 10.5 | 7.2 | 7.6 | 5.9 | 8.2 | 6.3 | 6.9 |
| 2.0 | 4.4 | 5.9 | 11.7 | 11.3 | 10.3 | 10.2 | 10.6 | 12.3 |
| — | 1.9 | 2.2 | 2.3 | 2.8 | 2.4 | 1.0 | 1.1 | 0.4 |
| — | 1.8 | 1.1 | 1.5 | 2.0 | 3.1 | 1.5 | 1.6 | 1.7 |
| — | 17.4 | 14.1 | 24.2 | 20.8 | 22.5 | 17.2 | 18.8 | 11.4 |
| 2.2 | 2.9 | 1.5 | 0.9 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 |
| 13.8 | 8.9 | 7.3 | 9.6 | 14.3 | 18.4 | 18.8 | 19.6 | 21.2 |
| 12.4 | 3.2 | 4.5 | 9.5 | 5.6 | 3.0 | — | — | |
| — | — | — | — | 0.1 | 1.6 | 1.9 | 1.7 | 2.9 |
| — | — | — | — | — | — | 7.8 | 11.4 | 8.9 |
| 100 | 98.8 | 99.2 | 99.2 | 99.8 | 99.4 | 100 | 99.8 | 99.0 |
| — | 1.2 | 0.8 | 0.8 | 0.2 | 0.6 | — | 0.2 | 1.0 |
| 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100.0 | 100.0 |

## Table 6

# Projects Approved by the Fund in 1981

| Project Number | Project Title | Agency | Region | Total Cost | UNEP Cost |
|---|---|---|---|---|---|
| FP/0104-80-01<br>ME/0104-80-01 | Feasibility Study for the Development of a Co-operative Project on Mediterranean Coastal Human Settlements. | Town Pl. Inst. of Dalmatia, Yugoslavia. | Eur. and Med. | 50,000 | 8,700 |
| FP/0104-80-02 | Expert Group Meeting on Ecosystems Approach to Human Settlements Planning. | Internal | Global | 42,090 | 42,090 |
| FP/0107-79-02 | Manual of the Analysis of Environmental Carcinogens—Selected Methods. | IARC | global | 97,100 | 57,500 |
| FP/0107-79-04 | Executive Summaries of Environmental Health Criteria. | WHO | Global | 93,000 | 46,000 |
| FP/0107-79-05 | Workshop on Food and Nutrition Planning, Programming, Implementation and Evaluation. | FAO | Global | 125,500 | 53,800 |
| FP/0107-80-03 | Prevention of Risk to Health through Continuing and Systematic Surveillance of ''Drinking Water Quality'' | WHO | Global | 288,600 | 188,600 |
| FP/0107-80-05 | The Impact of the Long-range Transmission of Air Pollutants on the Health of Man and the Environment: Europe. | ECC | Europe | 500,800 | 200,600 |
| FP/0108-79-01 | Joint UNEP/PAHO Project on the Sero-epidemiology of Human Hydatidosis. | Pan Am. Health Org. Washington | Americas | 156,256 | 78,128 |
| FP/0108-79-02 | UNEP/WHO Expert meeting on Methods for Surveillance, Prevention and Control of Cysticercosis/Taeniasis and Echinococcosis/Hydatidosis—Geneva 1979. | WHO | Global | 16,000 | 11,000 |
| FP/0108-80-01 | Latin American Inter-country Programme for the Development and Application of Integrated Pest Control in Cotton Growing. | FAO | Américas | To be determined | 181,860 |
| FP/0303-79-03 | NGO Participation in UNEP's World Environment Day Programme 1980. | Envt. Liaison Centre | Global | 208,290 | 78,440 |
| FP/0303-80-01 | Multimedia Presentation on Environment and Development. | Government of Czechoslovakia | Global | 182,202 | 153,467 |

## Table 6

| Project Number | Project Title | Agency | Region | Total Cost | UNEP Cost |
|---|---|---|---|---|---|
| FP/0303-80-02 | NGO Participation in Increasing the Information Flow Regarding UNEP Priority Areas. | Envt. Liaison Centre | Global | 285,400 | 73,000 |
| FP/0305-80-01 | Preparation of Environmental Education Curriculum Materials for Elementary and Secondary Schools. | UN Internat. School, N.Y. | Global | 122,000 | 80,000 |
| FP/0305-80-02 | Environmental Education, Training and Research for Adult Education. | Internal | Regional | 30,582 | 30,582 |
| FP/0305-80-03 | Promoting an Understanding of Conservation through Information, Education and Training. | IUCN | Global | 498,000 | 247,5000 |
| FP/0306-80-01 | Introduction of an Environmental Training Component within ILO Management Development Programmes. | ILO | Global | 764,380 | 355,980 |
| FP/0402-80-01 | Workshop on Biotechnology and Resource Recycling. | Univ. of Waterloo, Waterloo, Ontario, Canada | Global | 49,500 | 29,500 |
| FP/0402-80-02 | Information Dissemination on Environmentally Sound and Socially Appropriate Food Processing Technologies. | ILO | Global | 132,000 | 72,000 |
| FP/0402-80-03 | A Study of Biotechnological Processes Relevant to Environment and Development (Preparatory Activity). | Univ. of Sussex, U.K. | Global | 15,004 | 13,640 |
| FP/0404-80-01 | Inter-Regional Seminar of Alternative Patterns of Development and Lifestyles | Internal | Global | 48,533 | 48,533 |
| RA/0404-80-01 | Research into the Interrelationships between People, Resources, Environment and Development (Preparatory | Internal | Global | 100,000 | 100,000 |
| FP/0404-80-02 | Horizontal Co-operation in Latin America Relating to Style of Development and Environment. | ECLA | Americas | 640,000 | 350,000 |
| FP/0408-79-01 | Consultation of Reduction of Post-Harvest Losses in Fruits, Vegetables Roots and Tubers. | FAO | Global | 91,100 | 50,100 |
| FP/0501-79-02 | Study of the Feasibility of Monitoring Background Levels of Selected Pollutants in Open Ocean Waters. | IOC/UNESCO | Global | 262,590 | 65,590 |

## Table 6

| Project Number | Project Title | Agency | Region | Total Cost | UNEP Cost |
|---|---|---|---|---|---|
| FP/0501-80-01 | Environmental Impact Assessment of Coastal Area Development. | WHO | Global | 112,460 | 70,400 |
| FP/ME/0501-80-02 | Sea Disposal Studies. | IMCO | Global | 52,250 | 26,000 |
| FP/0502-80-01 | Promotion of the Establishment and Effective Management of Coastal and Marine Protected Areas. | IUCN | Global | 387,000 | 210,000 |
| FP/0503-79-06 | Workshop on Coastal Area Development and Management in South-East Asia. | UN/DIESA | Asia and Pac. | 113,340 | 38,800 |
| FP/0503-79-11 | Development of Legal Instruments for the Protection of the Marine Environment in South-East Asia. | ESCAP | Asia and Pac. | 18,000 | 11,000 |
| FP/0503-79-15 | South Pacific Regional Environment Programme (SPREP)—Development of an Environmental Programme for South-West Pacific. | SPEC, Suva; SPC, Noumea, ESCAP, Bangkok | Asia and Pac. | 427,175 | 312,000 |
| FP/0503-79-18 | Survey of Marine Pollutants from Industrial Sources in the West African Region. | UNIDO | Africa | 172,500 | 140,000 |
| FP/0503-79-20 | River inputs to the West African Region | UNESCO | Africa | 65,000 | 50,000 |
| ME/0503-80-01 | Mediterranean Action Plan, Blue Plan: Phase I. | MEDEAS France | Eur. and Med. | 1,203,150 | 922,500 |
| FP/0503-80-02 | Development of an Action Plan for the South-East Pacific. | South Pac. Comm. | Americas | 181,500 | 144,560 |
| FP/0503-80-04 | Preparation and Management of a Regional Seminar/Workshop on Coastal Area Development and Management in West Africa. | UN/DIESA | Africa | 232,253 | 194,253 |
| FP/0503-80-05 | Development of a Comprehensive Action Plan for the Protection and Development of Marine Environment and Coastal Area of the East Asia Region. | Internal | Asia and Pac. | 92,000 | 92,000 |
| FP/KA/0503-80-06 | IMCO/UNEP International Workshop on Combating Marine Pollution from Oil Exploration, Exploitation and Transport in the Kuwait Action Plan Region. | IMCO | Asia | 100,000 | 6,400 |
| RB/0503-80-07 | Protection of the Marine and Coastal Environment of the Caribbean Islands. | Carribbean Community Secretariat, Guyana. | Americas | 398,030 | 248,530 |

## Table 6

| Project Number | Project Title | Agency | Region | Total Cost | UNEP Cost |
|---|---|---|---|---|---|
| RB/0503-80-08 | Formulation of a Caribbean Oil Spill control Plan. | Org. of Am. States, Washington. | Americas | 111,572 | 36,572 |
| FP/0700-79-03 | International Workshop on Environmental Implications and Strategies for Expanded Coal Utilisation. | Beijer Inst., Sweden. | Global | 176,000 | 133,000 |
| FP/0700-79-05 | The Feasibility of Harnessing Renewable Sources of Energy in Rural Areas in Indonesia. | Min. of Mines and Energy, Indonesia. | Asia and Pac. | 46,500 | 46,500 |
| FP/0700-79-06 | The Feasibility of Harnessing Renewable Sources of Energy in Rural Areas of Somalia. | Government of Somalia | Africa | 48,000 | 48,000 |
| FP/1001-79-03 | Development and Application of Appropriate Environmental Impact Assessment and Management Methodologies/Case Study for the Industrial Touristic Corridor Area between Rio de Janeiro and Sao Paulo, Brazil. | FEEMA, Brazil. | Americas | 960,300 | 238,500 |
| FP/1002-80-01 | Ad Hoc Meeting of Senior Government Officials Expert in Environmental law—Phase I. | Internal | Global | 110,000 | 110,000 |
| FP/1105-80-01 | Regionalization of the 'Ecotheque Mediterraneenne'—Preparatory Phase | UNESCO | Eur. and Med. | 77,500 | 70,000 |
| FP/1105-80-02 | Conservation Strategies for Critical Ecosystems, Especially Coastal and Freshwater Ecosystems. | IUCN | Global | 297,900 | 232,500 |
| FP/1107-79-04 | Protection of the Lithosphere as a Component of the Environment | UNESCO | Global | 1,941,399 | 1,400,727 |
| FP/1107-80-01 | Environmental Aspects of Water Development in the Mekong Delta (Phase I). | Internal | Asia and Pac. | 35,800 | 35,800 |
| FP/1107-80-04 | Integrated Irrigation: Demonstration in Sudan. | WHO | Africa | 529,131 | 206,143 |
| FP/1107-80-05 | Ecosystem Dynamics in Freshwater Wetlands and Shallow Water Bodies. | SCOPE | Global | 581,000 | 351,000 |
| FP/1108-80-01 | Expert Consultation on the Conservation of Genetic Resources of Fish. | FAO | Global | 27,150 | 16,250 |

## Table 6

| Project Number | Project Title | Agency | Region | Total Cost | UNEP Cost |
|---|---|---|---|---|---|
| FP/1110-80-01 | Monitoring the Status of Wild Fauna and Flora. | IUCN | Global | 633,000 | 127,500 |
| FP/1110-80-02 | Promoting the Conservation of Wild Fauna and Flora. | IUCN | Global | 540,000 | 420,000 |
| FP/1110-80-03 | Promotion of the Establishment and Effective Management of Terrestrial and Freshwater Protected Areas. | IUCN | Global | 546,900 | 217,500 |
| FP/1110-80-04 | Promotion of Conservation Strategies in Selected Tropical Countries. | IUCN | Inter-regional | 508,500 | 300,000 |
| FP/1200-80-01 | Improvement of Tropical Cyclone Warnings Including Storm Surge Alerts. | WMO | Americas | 25,800 | 20,800 |
| FP/1301-80-01 | Climate Related Monitoring. | WMO | Global | 1,445,000 | 433,900 |
| FP/1301-80-02 | United Nations Seminar on Remote Sensing Applications in Geology and Hydrology (Baku, USSR, 17-18 November 1980). | USSR Comm. for UNEP | Global | 264,946 | 115,696 |
| FP/1303-80-01 | Climate Conference for Asia and Western Pacific and Climatic Atlas of Asia. | WMO | Asia and Pac. | 248,900 | 127,000 |
| RA/1600-80-01 | NGO Environmental Information Data System. | Envt. Liaison Centre | Global | 75,370 | 50,000 |
| FP/1700-80-01 | Desertification Assessment and Mapping. | FAO | Global | 828,750 | 460,350 |
| FP/1700-80-02 | Workshop on the Physics of Desertification. | UNESCO | Global | 132,300 | 49,800 |
| FP/1700-80-03 | Green Belt around the City of Niamey | Government of Republic of Niger. | Africa | 102,000 | 60,000 |

# Part Three: Guest Editorial

A.W. Clausen
President of the World Bank

## SUSTAINABLE DEVELOPMENT — THE GLOBAL IMPERATIVE

*We are rushing forward unthinkingly through days of incredible accomplishment... And we have forgotten the earth, forgotten it in the sense that we are failing to regard it as the source of our life.*

The line appeared in a book called *Our Plundered Planet* which appeared in 1948. Its author, Fairfield Osborn, was appalled at what he described as "the accumulated velocity with which man is destroying his own life sources". He insisted then — and it pertains equally today — that the only kind of development that makes sense is development that can be sustained.

From this basic premise, I would like to make three main points:

- *First*, that if our goal is sustainable development, our perspective must be global;
- *Second*, that human development must allow for continued economic growth, especially in the third world, if it is to be sustainable; and
- *Third*, that sustainable development requires vigorous attention to resource management and the environment.

Let us examine, then, the first point, *that if our goal is to be sustainable, our perspective must be global.*

The environment movement began in the industrial countries. But these are linked together with the developing countries more than is usually recognized. They are interdependent economically, but are linked environmentally.

This is obvious in the case of energy. The prospect of running down fossil fuel reserves has become a major world issue, with certain third world countries crucial in deciding its outcome.

Other mineral resources are finite, too. And, again developing countries — as major suppliers of many of the key minerals used by industrial countries — will have a say in determining how these resources are managed.

Sustainable population growth is a fundamental environmental concern. By the year 2000, the world's population is likely to exceed six billion, with nearly five billion people just in the developing countries and over half of them crowded into cities.

Many of the environmental problems we tend to associate with industrial countries are also prevalent in developing countries. Urban air pollution, for example, is often worse in countries that cannot yet afford even minimal controls.

But some environmental problems of world interest are concentrated in the developing countries — deforestation, for example. Primarily because of the growing need for firewood, third world forests are being cut down ten times faster than new ones are being planted. As a result, planet earth has lost about a quarter of its closed-canopy forests over the last 20 years.

The developing world also has soil problems. Deforestation has contributed to severe erosion in some parts of the developing world. In tropical areas, soils tend to be especially fragile and can quickly be rendered almost useless by improper agricultural practices.

Environmental spoilation is an international cancer. It respects no boundaries. It erodes hard-won economic gains and thus the hopes of the poor.

Finally, sound development worldwide contributes to peace. And the world's conservation, in the most literal sense, may depend on peace.

In the early 1970s, when environmental concerns were approaching a peak in the industrial countries, these same concerns were met with considerable scepticism in the third world. Intense aspirations for development are widespread in the third world. In many nations, economic growth is a matter of life or death for thousands of people on the margin of subsistence. Third world leaders were concerned that environmental measures should not keep their peoples from fully realizing the benefits of economic growth.

Since the industrial countries consume most of the world's natural resources concern in the rich countries about population growth in poorer countries seemed misplaced — even sinister — to some leaders in the developing countries.

Nevertheless, many of the world's environmental problems increasingly depend on third world co-operation for their solution. Success on the environmental front must involve the co-operation of all sectors of the international community.

Over the last decade, the World Bank has supported the goal of achieving sustainable development on a global scale. Owned by 141 member nations, the Bank lends to third world countries in support of their long-term development objectives. It is entirely appropriate that we not only continue but expand our efforts to insure that improvements achieved in human living conditions today are improvements that can last until we reach the tomorrows.

# The Global Imperative

My second main point — *that to be sustainable human development must also include economic growth* — follows from the global perspective on environmental concerns.

Even in wealthy countries, environmental protection has, to some extent, been crowded aside by priority attention to economic difficulties. Yet the world's recent economic troubles have also been particularly severe for developing countries — and the need for economic growth in these countries is overwhelmingly compelling.

Third world leaders are absolutely right to point out that poverty is the very worst pollution that faces us on earth today. Only about a quarter of the people who live in developing countries, for example, have access to clean water.

In the third world, disease typically takes up a tenth of a person's potentially productive time. Disease causes suffering, dampens initiative, disrupts education, and stunts physical and mental development.

Poverty also puts severe — and often irreversible — strains on the natural environment. At survival levels, people are sometimes compelled to exploit their environment too intensively. Poverty has often resulted in long years of mismanagement of our natural resources, evidencing itself in overgrazing, erosion, denuded forests, and surface water pollution.

Our experience at the World Bank seems to indicate that it is much easier to deal with the negative environmental effects of development than with the negative environmental effects of pervasive and persistent poverty.

The developing regions of the world are not all characterized by severe poverty, of course. But aspirations for a better life — i.e., more schooling, economic opportunity, and freedom of choice — are also powerful among the middle-income countries. In fact, aspirations for economic growth may be strongest in countries at moderate levels of income — i.e., those countries which have enjoyed some growth over the last generation.

These hopes and aspirations are legitimate. They won't be easily denied — nor should they be denied.

I'm encouraged that environmental concerns in third world countries have become much more widespread over the last decade. Acccording to the World Environment Centre, 102 developing countries now have environmental ministries or similar top-level agencies. That compared to only eleven countries in 1972, the year of the now historic United Nations Conference on the Human Environment.

Of particular interest, perhaps, is that the People's Republic of China recently established an Office of Environmental Protection. Brazil's Ministry for the Environment, established in 1972 with three people, now has a staff of 200 Indonesia set up an environmental ministry in 1978, to deal with its enormous problems of water supply, deforestation, erosion, and industrial pollution, and to oversee the environmental implications of its development activities.

Two notable examples of countries that now consider environmental impacts much more carefully in the process of industrialization are Kuwait and Nigeria. Venezuela, too, has made much progress in recent years, in its awareness of environmental issues and the need to take corrective and preventive measures.

It isn't that third world countries are better able to afford environmental protection than they were ten years ago. They continue to be hard-pressed by slow growth, high energy prices, and high interest rates. But there is increasing awareness that environmental precautions are essential for continued economic development over the long run.

Conservation, in its broadest sense, is not a luxury for people rich enough to vacation in scenic parks. It is not just a "motherhood issue".

Rather, the goal of economic growth itself dictates a serious and abiding concern for resource management. Lower income countries also — perhaps especially — need to think beyond the next few years.

Agriculture is the major source of income and growth in most developing countries. That's why agriculture and rural development is one of the top priorities at the World Bank. And continued agricultural productivity certainly requires protection of the natural environment.

In Africa, for example, rain-fed agriculture will necessarily be the main source of increasing production for the foreseeable future. Yet the long-term potential for agriculture is being diminished — in some countries seriously — by overintensified cultivation and overgrazing.

In the industrial countries, we are accustomed to an adversary relationship between the goals of economic growth and environmental protection. But in the poorer developing countries, continued growth more often depends on environmental stewardship, and, conversely, a better environment more often than not depends on continued economic growth.

And so the point is that, in the third world context, the twin goals of development and sustainability can be allied — and *must* be allied. Thus, our vision of a sustainable world must realistically include economic growth, especially for those peoples who haven't yet participated appreciably in the benefits of economic growth.

This brings me to my third main point and the point I most want to stress: *in order to be sustainable, development must include vigorous and studied attention to resource management.*

I want to deal with two different types of resource management — actions to mitigate negative side-effects of development on the one hand, and positive actions to enhance the environment on the other.

On the first of these, it would be perhaps useful if I reviewed our own experience at the World Bank in taking precautionary measures against the negative side-effects of development.

The Bank is well-known for the thoroughness of its project preparation. And, for a decade now, the Bank has required, as part of project evaluation, that every project it finances be reviewed by a special environmental unit.

As a matter of policy, we won't finance a project that seriously compromises public health or safety; that causes severe or irreversible environmental deterioration; that displaces people without adequate provision for resettlement; or that has transnational environmental implications which are importantly negative.

Our environmental experts have reviewed more than 2,000 projects and programmes in developing countries since 1970.

We've found that the cost of paying attention to environmental concerns has been much lower than many people expected when this procedure was first established. Nearly two-thirds of the projects reviewed have raised no serious health or environmental questions, and I'm pleased to say that it has been possible to incorporate adequate protective measures in all the projects we have financed during the past decade.

The cost of these environmental and health measures has proved not to place an unacceptable burden on our borrowing countries. And we've learned, as have many private corporations, that the cost tends to be lower the earlier that environmental problems are identified and handled.

We're convinced that it's almost always less expensive to incorporate the environmental dimensions into project planning than to ignore them and pay the penalties at some future time.

It costs a lot less, for instance, to protect the forested watershed above a new dam than to deal with a silted reservoir after it's been built. Similarly, the benefits of an irrigation project can be diminished if, for lack of proper planning, it leads to an increase in schistosomiasis.

We're financing an increasing number of projects to rectify undesirable side-effects of past development. We are working with the Mexican authorities, for instance, on various environmental problems, including air and water pollution in Mexico City. In Kenya, we're financing a wildlife management project. We're also involved in helping Nepal deal with its dramatic problems of deforestation and soil erosion.

In the Sahel region, we've financed a series of projects designed to halt the expansion of the desert and, more recently, also to reclaim desertified land by providing shelter belts of restored forest cover.

On the basis of the Bank's experience in trying to anticipate environmental problems associated with development, we have published extensive checklists, handbooks, and guides for different types of projects — to help Bank staff and planners around the world think through all the identifiable effects of development projects.

In addition to these and many other protective and corrective efforts being made in third world countries, I want also to cite a number of positive efforts to enhance the environment, although environmentalism tends to be identified with precautions in development, I believe that some of the most effective environmental efforts are those that achieve development and sustainability at the same time.

For example, improving systems of water supply and waste removal is one obvious area in which we can enhance the environment through development.

Our lending programmes in water supply and waste disposal have increased from an annual average of $300 million in the mid-1970s to more than $700 million currently. We are emphasizing economical technologies (such as standpipes or hand pumps for water, and septic tanks or latrines for sanitation), since they cost a fifth to a tenth as much as piped systems — and thus make it possible to improve the living environment budgets.

Rapid urbanization is going to continue throughout the developing world, even if vigorous rural development and population policies are adopted. We expect that the urban population of the third world will continue to grow about twice as fast as the rural population over the next 20 years. And growing cities, if not properly managed, pose special environmental problems — especially water and waste disposal problems among the poor.

So we also have an active programme of investment in urban infrastructure. Our purpose is not simply to help public authorities cope with current urban growth, but rather to introduce appropriate technologies — and to develop institutions that are better able to cope, on a continuous basis, with burgeoning city growth in the third world.

# The Global Imperative

A second sector where environment and development directly interface is energy. This area, along with agriculture and rural development, demands the highest priority among the many activities of the Bank.

In addition to rapidly expanding our lending to accelerate the development of hydro and fossil fuel resources, the World Bank is also encouraging energy conservation and the development of renewable energy sources.

Energy conservation has become a major theme in our dialogue with borrowing governments about their development strategies, because energy imports now represent a heavy financial burden for those developing countries which are not sufficiently self-reliant for their own growing energy requirements.

With regard to renewable energy sources, we attach high priority to forestry.

While rising oil prices have captured the headlines, for almost half the world's population energy problems take the form of a daily search for firewood with which to cook.

The World Bank has embarked on a vigorous expansion of its forestry programme. Our average annual lending for forestry projects over the last four years has been six times what it was in the previous four years.

Two of our successful forestry projects — one in Korea and another in India — supported programmes which emphasized public education to encourage tree-planting.

In Burundi — where deforestation around the capital city has forced many low-income families to spend 40 per cent of their incomes on firewood and fuel — the Bank has financed a promising programme to introduce improved cooking stoves. Traditional stoves waste as much as 90 per cent of the heat they generate, and open fires are even less efficient.

In addition to our concern about forestry and firewood, the Bank has also been exploring new ways through which developing countries can increase the amount of energy they get from other renewable sources: through the production of alcohol, for example, or — over the longer-term — by taking advantage of the abundance of sunshine with which much of the developing world is blessed.

The developing countries already depend on traditional biological sources for a quarter of their energy requirements. And we think they can substitute renewable sources for another 5 to 15 per cent of their energy needs before the end of this century.

Finally, a third area, in addition to water supply and waste removal and energy, where the goals of economic development and environmental protection coincide is population planning.

We now know that, although family planning programmes help, the most effective way to moderate population growth is to alleviate poverty and to provide improved health care.

Population growth rates in the third world began to drop in the mid-1960s. Birth rates have declined at least 10 per cent in the world's two most populous countries, China and India. Birth rates have also declined in Indonesia, Turkey, and in most of the middle-income countries of Latin America and East Asia.

Quantitative analysis suggests that social and economic improvements (such as higher incomes, literacy and life expectancy) accounted for as much as 60 per cent of the variation in fertility among developing countries from 1960 to 1977. The strength of family planning programmes explained an additional 15 per cent.

The World Bank remains committed to supporting development efforts that assist the poor to become more economically productive. We continue to invest significantly in rural development, education, health, and family planning.

One of the dividends of this whole range of investment — beyond the benefits to the families who are helped directly — will be a more rapid shift to a sustainable pattern of global population growth.

These are just a few examples of development which obviously contribute to long-term sustainability as well as to short-term benefits. But, as a matter of fact, we think that all development can enhance the conditions in which we live.

When we finance agricultural development, measures are taken both to develop existing resources and also to protect those resources for the future. When we invest in industry, given proper precautions, increased production means higher incomes which workers can use to improve the quality of their environment and the lives of their families.

Our mandate is economic development, and development, of necessity, involves changing the natural and social environments. But with due attention to resource management all economic development should, on balance, improve people's environment, in the broad sense of the word. That is, after all, the fundamental purpose of development.

During a formative period of economic development in the United States, President Theodore Roosevelt argued that conservation was essential to the long-term economic growth of this country. He said:

> *The Nation behaves well if it treats the natural resources as assets which it must turn over to the next generation... Conservation means development as much as it does protection.*

Today our perspective must be global, and our concern for the environment must be even more urgent than in Roosevelt's time. And his words are still true. That concern is an essential ingredient of development.

The international development community must face that fact with realism and sensitivity. And I ask any ardent defenders of the environment to join efforts with those of us who are trying to assist the developing countries accelerate their economic growth and improve the quality of life of their societies.

All of us — all around the world — who identify themselves primarily either with the international development community, or with the international conservation movement, ought to be more partners than partisans.

*For sustainable development, and wise conservation are, in the end, mutually reinforcing — and absolutely inseparable — goals.*

# Abbreviations

**AAEA**
African Adult Education Association

**ACC**
Administrative Committee of Co-ordination (United Nations)

**AIBD**
Asian Institute of Broadcasting and Development

**ALECSO**
Arab League Educational, Cultural and Scientific Organization

**ASEAN**
Association of South-East Asian Nations

**CBA**
Cost benefit analysis

**CCOL**
Co-ordinating Committee on the Ozone Layer

**CEFIGRE**
International Training Centre for Water Resources Management

**CIFCA**
International Centre for Training and Education in Environmental Science for Spanish Speaking Countries

**CILSS**
Permanent Interstate Committee on Drought Control in the Sahel

**CITES**
Convention on International Trade in Endangered Species

**CMEA**
Council for Mutual Economic Assistance

**CPPS**
Permanent Commission for the South Pacific

**CUCC**
Co-ordinating Unit for the Carbon Cycle

**DESCON**
Desertification Conference of the United Nations

**ECA**
Economic Commission for Africa

**ECDIN**
Environmental Chemicals Data and Information Network

**ECE**
Economic Commission for Europe

**ECWA**
Economic Commission for Asia

**EEC**
European Economic Commission

**EETU**
Environmental Education and Training Unit

**ELC**
Environmental Liaison Centre

**ESCAP**
Economic and Social Commission for Asia and the Pacific

**FAO**
Food and Agriculture Organization

**GC**
Governing Council (of UNEP)

**GEMS**
Global Environmental Monitoring System

**IAEA**
International Atomic Energy Agency

**IARC**
International Agency for Research on Cancer

**IAWGD**
Inter-Agency Working Group on Desertification

**ICIPE**
International Centre for Insect Physiology and Ecology

**ICPEMC**
International Commission for Protection against Environmental Mutagens and Carcinogens

**ICSU**
International Council of Scientific Unions

**IIED**
International Institute for Environment and Development

**ILO**
International Labour Organisation

**IOC**
International Oceanographic Commission

**IPAL**
Integrated Project on Arid Lands, UNEP/UNESCO

**IPCS**
International Programmes on Chemical Safety

**IPS**
Inter-Press Service

**IRPTC**
International Register of Potentially Toxic Chemicals

**IUCN**
International Union for Conservation of Nature and Natural Resources

**IWC**
International Whaling Commission

**JUNIC**
Joint United Nations Information Committee

**MAB**
Man and Biosphere Programme, UNESCO

**MEDEAS**
Centre d'activités développement environnement en Méditerranée

**MIRCENS**
Microbiological Resource Centres

**NFP**
National Focal Point

**NGO**
Non-Governmental Organization

**NIDS**
New International Development Strategy

**OAU**
Organization of African Unity

**OECD**
Organization for Economic Co-operation and Development

**PAC**
Programme Activity Centre

**PAP**
Priority Actions Programme

**PEP**
Precipitation Enhancement Project

**PFA**
Press Foundation of Asia

**PII**
Press Institute of India

# Abbreviations

**RIO**
Regional Information Officer

**SAC**
Statistical Advisory Committee, FAO

**SEPA**
Science Education Programme for Africa

**SOS**
Save Our Soils

**SPC**
South Pacific Commission

**SPEC**
South Pacific Bureau for Economic Co-operation

**SWMTEP**
System-Wide Medium-Term Environment Programme

**UNCHS**
United Nations Centre for Human Settlements

**UNCOD**
United Nations Conference on Desertification

**UNDP**
United Nations Development Programme

**UNDRO**
United Nations Disaster Relief Organizations

**UNEPCOM**
Commission of the USSR for UNEP

**UNESCO**
United Nations Educational, Scientific and Cultural Organization

**UNICEF**
United Nations Children's Fund

**UNIDO**
United Nations Industrial Development Organization

**UNIS**
United Nations Information Service

**UNSO**
United Nations Sudano-Sahelian Office

**WCIP**
World Climate Impact Studies Programme

**WCOTP**
World Confederation of Organizations of the Teaching Profession

**WCP**
World Climate Programme

**WCS**
World Conservation Strategy

**WHO**
World Health Organization

**WMO**
World Meteorological Organization

**WWF**
World Wildlife Fund

# General Information

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1981 A WORLD DEBATE ON ENVIRONMENTALLY SOUND NEW AND RENEWABLE SOURCES OF ENERGY